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The Economy of Inland Transport.

IT has been said that he who can cause two blades of grass to grow where but one grew before, is a benefactor to mankind. It may be said with equal truth that whosoever can enable the transport of two tons of merchandise to be undertaken at a rate of freight hitherto charged for the conveyance of one ton is also a benefactor to his species. In order to effect this most desirable result we have to enquire: How can we secure, in the general interest of the commonweal, the indisputable resulting advantage from a condition in which the trader enjoys the free unrestricted competition of water transport and land transport, with the election of the the choice of either according to the nature of the services required? Much light as to the course to pursue is afforded by the lines indicated in the resolutions adopted at the Fourth International Congress on Inland Navigation, held in Manchester on July 28, 1890, and the subsequent week. At this important conference of eminent transport authorities, representative of all the leading commercial nations, the results of prolonged deliberations were summarised in the form of resolutions, the terms of which are as follows:—

1. Owing to the low cost of construction and maintenance of waterways, they form a valuable means for transporting large masses at cheap rates, and should be the object of earnest attention on the part of those concerned, and of the State.

2. In order to secure this, a cheap, thorough-going transport system, with uniform dimensions, is essential.

3. The existence and development together of railways and of waterways are desirable: (A) Because these two means of transport are the complement of each other, and ought each to contribute according to its special merits to the public good; and (B) because, from a broad point of view, the industrial and commercial development which will result from the perfection of means of communication must in the end profit both the railways and the waterways.

4. The great value of waterways to the country at large, and the fact that they are the feeders of, and supplementary to, railways, justifies the State and public bodies in assisting the construction and maintenance of waterways of uniform dimensions, so as to encourage through traffic at low rates.

Should the programme formulated in the foregoing resolutions be followed, we shall arrive at a much earlier solution of the inland transport problem than can reasonably be hoped for as the result of the perennial enquiries made by Royal Commissions and Parliamentary Committees appointed to investigate as to the rates of freight which it would be equitable for merchants and manufacturers to pay, and the covered charge for the transport of goods. It is no longer a question of what the traders must pay, it has become a question of what they can pay. And, as regards the water and land traffic carriers' it is not so much a question of what the companies may charge, as a question of what they can charge with any reasonable anticipation of yielding a dividend. The determination of such issues could not be accomplished by any legislative enactment. In France, Germany, Belgium, and Holland, countries where there is an effective competition between water transport and land transport, the railway rates average about 40 per cent. less than the corresponding charges levied on the railways of the United Kingdom. The late Mr. John Slagg, M.P., one of the representatives of the Government of the United Kingdom on the Directorate of the Suez Canal, in an address to the Manchester Chamber of Commerce in April, 1882, directed attention to the urgency of the situation, in view of the increasing keenness of foreign competition, in the following terms: "When we consider the enormous competition to which we are subjected by foreign nations, and the almost costless canal traffic extending in France to every market and centre of industry, we should see the necessity of bestirring ourselves to make the best possible use of similar advantages in this country." The identification of the French Government with the development of inland navigation in that country forms a marked contrast with the apathetic attitude which has hitherto characterised the Government of the United Kingdom. In France, up to 1868, the expenditure on 6,657 miles of inland navigation amounted to 47,295,867*l.*, of which 38,790,766*l.* was expended by the State, 4,580,440*l.* partly by State and private companies, and 4,924,457*l.* by exclusively private companies. Of this sum, 32,738,715*l.* was expended on canals, and 14,557,152*l.* on river navigation. The average outlay per mile on canal navigation was 10,500*l.*, and on river navigation 4,000*l.* The average yearly cost of maintenance of canals between 1839 and 1868 was 92*l.* 14s. per mile, and that of rivers, 34*l.* 7s. per mile. On the inland waterways of France the total cost of transport,—including toll and freight—amounts in all to about four-fifths of one penny per ton per mile. The tolls on the State inland navigation in France were abolished by a statute of February 19, 1880, no charge being made for the right of passage, excepting on a few canals remaining in the hands of some companies.

In 1872 a commission appointed to inquire into the economy of inland navigation in France observed *inter alia* in their report: "Water carriage cannot boast of speed, and therefore in this respect it will be almost always outrivalled by rail carriage, but it still possesses advantages in cheapness and in greater power for the transport of bulky articles. Compelled to carry passengers and goods at different speeds, railways have not an unlimited power of transport. On the other hand, without being exactly unlimited, the power of water-carriage is capable of much greater extension. Owing to the facility with which its less costly plant can be increased, and to the facility with which boats can be stopped everywhere and anywhere on their course, water-carriage possesses two special advantages, by which, even at the present day, it is enabled to play an important part in contributing effectively to agriculture and other industries, as well as, in certain cases, competing successfully with railways." In conclusion, the Commission observe, "France has been long enough led to think that its establishments and institutions are unrivalled, and that it has nothing to expect or learn from other quarters. A cruel experience has put to flight these patriotic exaggerations, and has taught us that it is not desirable for a nation, any more than for individuals, to live apart in contemplation of or in admiration of its own works." This observation, though intended for the edification of the National Assembly of France, conveys food for reflection

among those engaged in the administration of the United Kingdom. The figures given in the Report on Internal Navigation in France by the Commission of 1872, as regards traffic on canals and canalised rivers, amounted to 835,113,017 ton-miles, and upon rivers to 383,359,100 ton-miles. During the sixty years of the railway era, we have so rapidly grown in wealth that we have been somewhat negligent of some things, and, in some respects, too prodigal. The English railway system is undoubtedly the most remarkable development in transport to be found in the entire record of the history of mankind. Dazzled, however, with the magnificent railway system we possess, we have for a long time neglected an ancient handmaid of commerce. We have, in effect, neglected our inland waterways for over half a century. While suffering a long sleep, like Rip Van Winkle, our continental neighbours have been busily occupied in providing the most economical methods of internal conveyance for heavy traffic and the raw materials required for manufacturing purposes. The Government of France, as the result of the inquiry in 1872 and a further investigation in 1874, have sanctioned an outlay of 33,300,000*l.* to be gradually expended in extending and perfecting the existing system of inland navigation in that country. The extensions comprise additions amounting to 1,817 miles. In view of the enormous expansion in the magnitude of the operations of our merchants and manufacturers, and the ever-growing demand for increased means of intercommunication, is it not paradoxical to find a diminution in the length of inland navigation in this country of over 300 miles? Why has Britannia, the greatest merchant-carrier on the great ocean highways of the world, let her inland waterways go by default? The most striking illustration of the apathetic attitude maintained in this country with regard to our inland waterways is the circumstance that, although most of the canal companies existed long before the railway companies were thought of, no compulsory returns as to capital, traffic, works, revenue, expenditure, profits, &c., could be enforced from the waterway companies until the operation of the Railway and Canal Act, 1888, which came into force on January 1, 1889. Under section 39, sub-section 2 of this Act the canal companies are compelled to make annual returns by a stipulated time, similar in character to those made by the railway companies annually since 1854. The returns made to the Board of Trade in respect of the canals and navigations for the year 1888, in compliance with the Act, were published in June, 1890. While imperfect in many particulars, the returns for 1888 certainly afford the most valuable insight into the economy of the inland navigation of the United Kingdom yet afforded. The subjoined statement, showing the distribution of mileage of the inland navigation systems of the United Kingdom, as severally under railway control and under independent administration, will be found instructive. The particulars are compiled from the Board of Trade returns, 1888:—

Inland Navigation, United Kingdom: Effective Mileage, 1888.

	m.	c.	m.	c.
ENGLAND AND WALES:—				
Great Northern	80	14	—	
Great Northern and Great Eastern	10	60	—	
Great Western	213	7	—	
Lancashire and Yorkshire	15	60	—	
London and North-Western	461	35¼	—	
Manchester, Sheffield, and Lincolnshire	164	52	—	
Midland	47	10¾	—	
North-Eastern	69	20	—	
Furness	1	41	—	
North Staffordshire	119	3	—	
West London Extension	0	32	—	
Mileage under railway control	1,183	15¼	—	
Mileage under independent administration	1,866	77	—	
			3,050	12¼
SCOTLAND—				
Caledonian	52	52	—	
North British	31	53	—	
Mileage under railway control	84	25	—	
Mileage under independent administration	69	40	—	
			153	65
IRELAND—				
Mileage under control Midland Great Western	96	0	—	
Mileage under independent administration	513	38	—	
			609	38
Total mileage in the United Kingdom			3,813	35¼
Total mileage under railway control	1,363	60¼	—	
Total mileage under independent administration	2,449	55	—	
			3,813	35¼

From the foregoing particulars it will be seen that out of a total of 3,813 miles of effective inland navigation within the United Kingdom, 1,364 miles, or 35·78 per cent., are under railway control, and that 2,449 miles, or 64·22 per cent., remain under independent administration. According to the returns made to the Board of Trade relating to the canals and navigations within the United Kingdom, the total volume of traffic which utilised this means of transport in the year 1888 amounted to 36,301,120 tons. During that year the volume of traffic using the railway system of the United Kingdom, according to the returns furnished to the Board of Trade, amounted to 281,748,383 tons, distributed over 19,812 miles of effective railways. Out of the 281·75 million tons conveyed on our railways, only 80·17 million tons consisted of ordinary merchandise, the remaining 201·58 million tons being described as minerals. The gross earnings averaged per ton of merchandise works out at 5s. $7\frac{26}{100}$d., those for minerals averaging 1s. $7\frac{38}{100}$d. The percentage of load consisting of merchandise during 1888 was 28·45, and that of minerals 71·55. The contribution to the whole of the gross earnings from the goods traffic on the railways from merchandise in 1888 was 58·59 per cent., the contribution from minerals only amounting to 41·41 per cent. The returns made to the Board of Trade for the year 1888 relating to the traffic conveyed upon inland navigations do not, as in the case of the returns from railways, distinguish as between ordinary merchandise and minerals. However, of the aggregate tonnage conveyed by inland transport on railways and waterways of the United Kingdom during 1888, the figures being 318,049,503 tons, the waterways only secured 11·41 per cent. of the whole volume of traffic as recorded by the Board of Trade. Although this is a relatively small figure, it is interesting to note that of the 36,301,120 tons conveyed upon the inland waterways during 1888, those under independent administration, according to the Board of Trade Returns, were the vehicles for the conveyance of 28,274,175 tons, while the waterways under railway control were only used as the means of transport for 8,026,307 tons. It is also interesting to note that, according to the same official authority, the proportion of net profit per mile of navigation during 1888 was slightly more than double on the independent navigations, over that earned upon those under railway control. And, further, that the proportion of expenditure to receipts was appreciably less during that year on the independent navigations than that upon the railway-controlled navigations.

As already observed, the volume of mineral traffic upon the railways of the United Kingdom is of much greater magnitude than the merchandise traffic, and the earning power of mineral traffic is considerably less than that of the merchandise traffic. The figures previously given show that the mineral load is 43·10 per cent. greater than that of merchandise, and that the earning power is 17·18 per cent. less. This appears to be a very unsatisfactory feature of railway economy, and there is a strong presumption that, on the whole, it is worked at a loss, and that this loss is compensated by the superior earnings of passenger and merchandise traffic. In France the Chemin de Fer du Nord is the only railway in the country which encourages mineral traffic, this heavy and unprofitable traffic being there principally conveyed by the waterways. The late Mr. J. Grierson, the well-known and capable General Manager of the Great Western Railway, one of the principal mineral lines, furnished particulars to the Select Committee of the House of Commons on Railway Rates and Charges, 1881–1882, showing that the cost of mineral terminals upon that extensive system was within a fraction of 2s. 3d. per ton. In 1880 the gross earning upon each mineral ton carried upon the railways of the United Kingdom was 1s. 9¼d. In 1888 the gross earning power of each mineral ton was only 1s. 7⅞d. Obviously, such rates being less than the cost of terminals, could not possibly contribute to net revenue. In addition to the unprofitable character of the mineral traffic, *per se*, another important feature must be taken into account, namely, the cost of the greater part of the shunting operations, which mostly have their origin in the necessity of relieving the lines of mineral trains to make way for passenger traffic. On the London and North-Western system one locomotive out of twelve is occupied in shunting operations, and on the Manchester, Sheffield, and Lincolnshire system two miles out of every five of the goods and mineral locomotive mileage run is referable to the same cause. Whether it be true or not that the railway companies make up losses on the working of the mineral traffic by the necessity of exacting higher rates than would otherwise be the case upon food commodities, manufactured goods, and upon the raw materials required for our leading industries, it is certain that a large proportion of goods now conveyed by rail could be much more cheaply carried by canal. Such a diversion of certain classes of traffic would not only prove to be a considerable factor as a matter of national economy, but it would also, without doubt, be of the greatest advantage to the shareholders of the railway companies themselves. According to the official report of the statutory half-yearly meeting of the Manchester, Sheffield, and Lincolnshire Railway Company, held on January 24, 1883, its well-known Chairman, Sir E. W. Watkin, Bart., M.P., on that occasion observed *inter alia*: "I am one of those who have never had any jealousy whatever on the question of competition between water and rail. I believe there is a trade for the water and for the rail. In addition to that, I think there is a traffic sometimes carried by railway which might be more profitably carried by water." An observation in such terms, coming from so redoubtable an authority, is pregnant with meaning. Sir Arthur Cotton, General, R.E., Madras, another eminent authority on matters affecting inland transit, in a "Memorandum on Canals" (*vide* Appendix No. 21. Report, Select Committee on Canals, 1883), having been conversant all his life with the subject, observes:—"The important subject of internal water-carriage has for fifty years been so totally lost sight of in consequence of the new start given to land-carriage by the discovery of railways, that it is now entirely behind all other material matters in its development. This has been especially the case in England. But now, at last, after fifty years' experience, it is beginning to be realised in other countries, especially in France, that railways cannot carry either so cheaply or in such large quantities as the healthy development of a country requires. In France they are so far aroused about this that they are spending many millions in putting the waterways on a totally different footing, both as regards management and construction, from what they have been hitherto . . . . I have no doubt that had a hundredth part of the thought that has been applied to land-carriage of late years been brought to bear upon internal water-carriage, England would have been bene-

fited to the extent of between 40,000,000*l.* and 50,000,000*l.* a year. . . . . A complete system of canals to connect all the great rivers, navigated by boats of 150 tons or so, worked loaded at six or eight miles, and empty at ten, with a charge of one-twelfth of a penny per ton mile, would give England an entirely new start all over the world in her trade." The efficacy of water competition with land transit has been forcibly described by one of the railway kings, Sir Richard Moon, until recently the Chairman of the London and North-Western Railway Company, who, when presiding at the statutory half-yearly meeting of that Company at Euston terminus on February 19, 1882, remarked *inter alia*: "that the sea and canals did more to bring down the railway rates than any competition among the railways themselves." With the frank avowals of eminent railway magnates and other authorities on inland transit as to the great utility and competitive powers of our inland waterways, there is every inducement to endeavour to obtain the full advantage of their utility and its application as a powerful competing factor.

The existing situation appears to be thus: the returns made to the Board of Trade for the year 1888, show that we had in that year in the United Kingdom 3,813 miles of effective inland navigation, and 19,812 miles of effective railways. It is utterly impossible to gather from the returns made to the Board of Trade what the paid-up capital of the inland navigations amounted to in that year. This is no reflection on the Board of Trade, but arises from the fact that most of the railway-controlled waterways have had their capital accounts merged into those of the railway companies. The paid-up capital of the railway companies within the United Kingdom, at the end of 1888, amounted to 864,695,963*l.* As regards England and Wales the fully paid-up capital of the railway companies, at the end of 1888, amounted to 714,036,571*l.*, and of this amount, 573,710,507, fractionally over 80 per cent. is held by twelve leviathan companies. These are respectively, stated in the order of precedence as to amount of capital, as follows: *London and North-Western, *Midland, *Great Western, *North-Eastern, *Lancashire and Yorkshire, *Great Eastern, *Great Northern, London and South Western, *Manchester, Sheffield, and Lincolnshire; London, Chatham, and Dover; London, Brighton, and South Coast; and the South-Eastern. The eight companies distinguished by the asterisks are the owners or lessees in perpetuity of 1,062 miles of inland navigation in England and Wales, out of 1,183 miles under railway control. By a gradual merging process the amalgamation of railway companies has resulted in the consolidation on such an extensive scale as to place four-fifths of the investments in railways in England and Wales in the hands of twelve giant companies, eight of whom have acquired by purchase or perpetual lease the control of over one-third of the mileage of the waterways as regards England and Wales. The prime object in view in this gradual consolidation has been to temper the keenness of competition. It must be conceded that many advantages arise from the centralisation of control, both to the railway companies and the public at large, in lessening working expenses and at the same time affording increased facilities for intercommunication by the mutual co-operation of these great railway systems. George Stephenson laid down the dictum, "Where combination is possible, competition is impossible." This is in a great measure true, because, although there are instances of keen competition between rival railway systems to be found, as a general rule the public are in the hands of the railway companies, and bound by the decisions arrived at as the result of mutual conferences at the Railway Clearing House. As regards competitive factors, the sea and the inland waterways are the most potent; but unfortunately for the public, owing to the difficulty of meeting with the suitable natural conditions, it is only at a limited number of points that the railways can be subjected to the competition of waterways. This highly important consideration should in itself constitute all the stronger reason why we should not neglect such opportunities as do present themselves. We have equally favourable physical conditions existing in the United Kingdom with those in France, suited for the purposes of inland navigation. But we have not turned them to the same account as our neighbours across the Channel.

If, in this country of ours, the spirit of the resolutions already referred to as having been adopted by the Fourth International Congress on Inland Navigation, held in Manchester during the autumn of last year, should influence practical efforts to realise the objects contemplated, some amends will, at any rate, be made for past default. The incorporation of the Manchester Ship Canal Company in 1885 is a forcible exemplification of the willingness of Parliament to give encouragement to enterprise calculated to develop our national resources. The Manchester Ship Canal, if brought, as seems now probable, to a successful completion, may prove to be the pioneer effort in a series of surprising developments. Preston, Sheffield, Nottingham, and Birmingham are all following in the wake of Manchester. What is required to be done is to adapt that remarkable system of inland navigation which had its inception by the construction of the Bridgewater canals, by the Duke of Bridgewater, with Brindley as his engineer, to existing requirements. That system is mainly comprised in a quadrilateral formed by the ports of Liverpool and Manchester (the limits of which are conterminous at Warrington) with the other chief ports of Hull, London, and Bristol. The most important links in the through routes of inland navigation which connect the Mersey, Humber, Thames, and Severn, are those which proceed obliquely through Birmingham from the Mersey to the Thames, and from the Humber through Birmingham to the Severn.

Dealing with the through inland water communication between the Mersey and the Thames, three different routes might be chosen; but any of these would require the utilisation of most of the same links in the chain. The most eligible, as traversing the districts with the greatest traffic requirements, would utilise the undermentioned inland navigations:—

Navigation.	Mileage.	Size of Lock. Lgth. Bdth. Dpth.
River Thames	20	Open navigation.
Grand Junction ...	94	80·0 by 14·6 by 4·6
Oxford	24	72·0 by 7.0 by 4.0
Coventry	27	72·0 by 7·0 by 4·0
*Birmingham	5½	No lock.
Coventry	5½	No lock.
*Trent and Mersey ...	67	72·0 by 7·0 by 3·6
Bridgewater	5¼	84·0 by 15·0 by 4·6
River Mersey	15	Open navigation.
Total mileage ...	263¼	

The through inland navigation between the Humber and Severn would utilise the undermentioned inland navigations from the Humber to the South Staffordshire mineral districts:—

Navigation.	Mileage.	Size of Lock. Lgth. Wdth. Bdth.
Humber (from Hull)...	18½	Open navigation.
Trent	102	90·0 by 15·0 by 3·4
†Trent and Mersey ...	26	72·0 by 9·0 by 3·6
Coventry	5½	No lock.
†Birmingham (estimated	27	72·0 by 7·0 by 4·0
Total mileage ...	172	

From the South Staffordshire mineral districts the through inland navigation from the Humber to the Severn estuary would utilise the undermentioned navigations:—

Navigation.	Mileage.	Size of Lock. Length. Width. Breadth.
†Birmingham...	10 ...	72·0 by 7·0 by 4·0
Worcester	30 ...	72·0 by 7·0 by 5·6
Severn	30 ...	150·0 by 30·0 by 6·0
Gloucester and Berkeley	16 ...	100·0 by 24·0 by 6·0
Total mileage...	86	

*These connecting links are under railway control.
† Railway-controlled.

From the foregoing particulars it will be seen that the through route between the Humber and the Severn would be 265 miles in length. A Provisional Committee has been formed in Birmingham in order to acquire the existing navigation between Birmingham and the River Severn for their improvement for vessels of 150 to 200 tons. The estimated outlay is 1,890,000*l.* This would include the purchase of the Sharpness and Gloucester Docks. Vessels of 2,000 tons register can be accommodated at the Sharpness Docks, and vessels of 800 tons register can navigate the Gloucester and Berkeley Canal as far as Gloucester, which is about 17 miles from Sharpness. The enterprise is styled the Birmingham and Bristol Channel Improved Navigation. The committee is strong in number and influence, and if they display the energy which the promoters of the Manchester Ship Canal undoubtedly did, they will have no difficulty in obtaining Parliamentary sanction for such an enterprise, and should they proceed with it, and realise their object, a stimulus will be given to other developments of a similar character.

It is scarcely necessary to observe that, although there is a through communication by waterways passing inland from the Mersey to the Thames, under existing conditions such a thing as through traffic is virtually dead. There are six different proprietary interests, and four breaks in the gauge of the locks, and the matter is further complicated by the railway possession of two of the connecting links. The measure of the economy to be effected by the reconstruction of the great trunk routes is demonstrated by a statement handed in to the Select Committee on Canals, 1883 (*vide* Appendix, No. 9), showing that the cost of canal transport as effected between London and Liverpool in two 25-ton canal boats would be 10s. per ton exclusive of tolls, which bring up the amount to 22s. 6d. per ton. If, however, the transport could be effected with three boats carrying 120 tons each, the dimensions being 84 ft. in length, 12 ft. in width, and 6 ft. 3 in. draught, towed by a steam barge containing 90 tons of cargo, making a load of 450 tons in all, the cost would be reduced from 10s. per ton to 2s. 6½d., exclusive of toll for the use of the canal. With regard to the tolls charged, the expansion of traffic caused by the improved means of transport would enable a much smaller toll to raise the increased revenue necessary on a much larger outlay. Probably the most perfect type of land transport in this or any other country is the Aire and Calder navigation, which connects Leeds with Goole. Originally, that navigation was only adapted for barges of some sixty tons. At present the locks upon it are 215 ft. long, 22 ft. wide, and 9 ft. deep. Steam haulage is in operation, and a tender can take through a lock at one passage a train of eleven boats of special construction, each carrying forty tons, making a load in all of 440 tons. The services of only four men are required under this system, the ordinary method requiring the services of twenty-four men. The cost of haulage under this system for general merchandise is $\frac{1}{3\frac{1}{4}}$th of 1d. per ton per mile, and for minerals only $\frac{1}{1\frac{1}{9}}$th of 1d. for the same weight and distance, and even includes taking the empties back. When these coal-boat trains arrive at Goole, there is a large hydraulic lift, which receives each boat after being caged in a cradle into which it is floated. After being secured, it turns over and discharges its cargo into the ship, and in lowering the empty boat or waggon, half the water of the lift is forced back into the accumulator. The speed ranges from 4½ miles to 6 miles an hour. The volume of traffic conveyed during 1888 amounted to 2,210,692 tons. Mr. James Abernethy, C.E., the well-known hydraulic engineer, stated, in evidence before the Select Committee on Canals, 1883, that a canal such as the Leeds and Liverpool Canal could be enlarged to the dimensions of the Aire and Calder Navigation for the sum of 12,000*l.* per mile. The Leeds and Liverpool Canal accommodates boats of about 60 tons (*vide* Report: Questions

and Answers, 1,126-1,132). This sum, of course, is in addition to the cost of acquisition.

The Weaver Navigation is another fine example of adaptation to modern requirements among the few to be found in this country. This navigation connects mid-Cheshire with the Mersey estuary, commencing at Winsford Bridge and terminating at Weston Point Docks, the distance being twenty miles. The vessels trading on this navigation are 90 ft. in length, 21 ft. wide, with a draught of 10 ft., carrying 250 to 300 tons. The volume of traffic in 1888 amounted to 1,498,120 tons. The River Weaver Navigation is a public trust, the surplus revenue being handed over to the county of Chester in relief of the rates. The train-boat system on the Aire and Calder Navigation seems to be the best adapted for through routes from coast to coast. The main object to keep in view, in adapting the inland navigation comprised in the quadrilateral already described to modern requirements, is not so much the provision of through access from coast to coast as to provide access to and from the Midlands for the traffic passing through the Mersey, Humber, Thames, and Bristol Channel ports, affording an avenue for the despatch of a superior unit of bulk. The volume of coast to coast traffic likely to find its way across the land separating the four rivers is very limited in quantity, hence the reason why such an amplification of the existing lateral canals would scarcely justify the expenditure. The greater the unit of bulk, the less proportional cost. Therefore the cardinal feature of any improvement of the inland navigation situated within the quadrilateral should be the provision of such superior means of access to and from the land-locked interior. The acquisition of the various navigations forming the links in the chain of communication would necessarily imply the acquisition of the whole line of navigation, although only a small portion might be required. These, however small in section, would be sure to prove to be excellent feeders to the main avenues suggested. As an illustration, the Birmingham canal navigation, a system 159 miles in length, one of the interests affected, is an aggregation of an innumerable series of narrow barge canals accommodating vessels of 25 tons. Modest, however, as this tonnage is, the traffic upon that system during 1888 amounted to 7,713,047 tons, the average per mile being 48,509 tons. Another small barge navigation system, the Bridgwater canals undertaking of the Manchester Ship Canal Company, which is 40½ miles in length, although only accommodating vessels of 50 tons, was the medium of conveyance of 2,916,754 tons, averaging 72,165 tons per mile. If these small barge canals secure such large quantities of traffic, how much greater a volume may not be expected when the main avenues suggested are provided?

The Manchester Ship Canal, from its geographical situation, must necessarily become the terminal of the Mersey main avenue. The acquisition of the connecting links in the chain of through inland navigation between the Mersey and the Thames, and the Humber and the Severn, and their improvement so as to form the avenues of conveyance for a unit of bulk of 450 tons, would completely revolutionise the present economy of inland transport between the Midlands and the four great commercial rivers. It does not sound a very large figure, but it means a great deal. It is equal to the load of three railway truck trains, with thirty waggons each holding 5 tons. The 528 miles constituting the two intersecting routes, and thus forming four main avenues between the Midlands and the four great ports, would form slightly over one-sixth of the total mileage of inland navigation in England and Wales. But no doubt that canals in direct connection would be absorbed, making at least 1,000 miles, forming one-third part, and situated in the very heart of South Britain. This desirable result would accomplish a number of much-wanted reforms. 1. Diversion of unprofitable traffic from the railways to the waterways. 2. The provision of cheaper facilities for transport. 3. The provision of more systematic services. 4. The arrangement of through routes and rates. 5. Uniformity in gauge of locks. 6. The more efficient maintenance of waterways. 7. The more extended application of steam haulage. 8. The better construction of boats. 9. The advantage of one common administration. 10. Placing the country in a better position to meet foreign competition.

NOTES.

THE Society for the Preservation of the Monuments of Ancient Egypt has issued a circular to its members and supporters, setting forth more particularly the objects of the Society and the detailed nature of the task which it has set before itself. The great mischief appears to be done by the operation of mineral salts in the soil, brought in by the water filtered into the buildings at the time of high Nile, and which crystallise in the pores of the stone, as the water evaporates, and disintegrate it. It is suggested by Grand Bey, the architect to the Public Works Department, that the readiest way to minimise this chemical attack on the lower portions of the walls and columns would be to make channels to give free access to the water at the time of high Nile, which would then enter as pure water, instead of finding its way through the ground and through the foundations and becoming impregnated with these destructive salts brought in with the water of infiltration. This seems a rather heroic remedy, and we should make some question whether this flooding of the temples would not be likely to produce as great mischief to the foundations in another way, substituting one species of attack on them for another. There can be no doubt however, of the necessity of taking measures to repair the damage already done to these great monuments of ancient architecture, and to place them in a state of security from further downfall than they have as yet experienced. We are assured that unless such measures are taken, a number of columns in the Great Hall at Karnac must fall before long, of course bringing down others and doing further damage in their fall. The following is the statement in the circular as to the repairs necessary to place Karnac in security, and the estimate of their probable cost:—

		£
"South Propylon ...	Consolidation of base, corroded by infiltrations	60
Temple of Khons...	Threatened ruin from same cause; consolidation of supports	456
Do. ...	Clearing out and placing a door ...	164
Shrine of Hathor...	Supports to architrave and column threatening to fall.	10
Temple of Amon ...	Clearing out and consolidation of supports	352
Temple of Seti ...	Clearing out... ...	60
Great Temple ...	Consolidation of foundations, supports, &c.	1,000
Do. ...	Clearing of rubbish, and ditch to drain off water	990
North Propylon ...	Supports to ceiling ...	20
East Propylon ...	Do. ...	12
	Total ...	£3,124."

The Society appeals to those who appreciate the value to the world of these grand relics to assist in providing funds for preventing them from going to ruin.

THE Railway Commissioners delivered judgment last week in a case of considerable interest, which was brought by the Winsford Local Board against the Cheshire Lines Committee. The latter company have discontinued the passenger service from Winsford, on the grounds that the traffic was unremunerative, and also that certain alterations recommended by the Board of Trade (in consequence of an accident) would entail a further outlay on this branch of nearly 6,000*l*. The outlay rendered necessary by the Board of Trade requirements was, however, estimated by the applicants' witnesses at 1,500*l*.; and a further instance of the unreliability of figures in such a case may be found in the estimated effect of the conveyance of passengers on this branch upon the "profit and loss account" of the company. The latter put in a statement showing a loss on a year's working, but the other side had so modified it as to show a balance the other way. The Commissioners, however, put these arguments aside altogether, and gave their decision upon what may be called public grounds. The traffic does not seem to have been large, but it was stated that it was rapidly growing when the service was discontinued, and that considerable inconvenience was caused by reason of the stoppage. The Local Board asked for, and succeeded in obtaining, an order requiring the Company to resume the service, relying on the Act of 1854 (known as Cardwell's Act), which contains the following clause:—"Every railway company shall, according to their respective powers, afford all reasonable facilities for the receiving and forwarding and delivering of traffic upon and from the several railways belonging to or worked by such companies respectively." The company urged that they were in such keen competition with other lines that they certainly would not abstain from carrying any traffic whatever which had a reasonable claim to existence; but Mr. Justice Wills's reading of the Act is that it compels railway companies, whether they like it or not, and whether it pays them or not, within reasonable limits to afford facilities for the conveyance of all classes of traffic. Passengers may, therefore, rest assured that they are regarded by the Railway Commissioners as an important "class of traffic," and that the tribunal will uphold any reasonable attempt to keep railway companies up to the statutory obligations they are placed under in return for the monopoly which has been granted them.

IT appears that public bodies in Scotland have also had their eyes upon Cardwell's Act, and have resolved to appeal to the Board of Trade and the Railway Commissioners to compel the companies whose employés are on strike "to fulfil their statutory obligations." The Edinburgh Town Council have also decided to invoke the intervention of the Board of Trade in the matter. In endeavouring to read between the lines of the conflicting reports as to the real position of affairs, it is difficult to judge how soon, or in what manner, the dispute will terminate. There is no doubt, however, that a serious deadlock is threatened, as the men are not at all unlikely to be joined by workers in other industries before long. The goods manager of an English railway, in a circular dated January 16, says:—"I am advised that the Caledonian Company are now working traffic as usual," but senders and receivers of traffic tell a very different tale. The contest resembles a Parliamentary one in which both sides are confident of victory, for, in endeavouring to convince people that they are winning, the combatants are prone to give undue prominence to slight signs of success.

IT is said that the rather illogical action of the Institute of Architects in giving the sum of money appended to the Soane Medallion while withholding the medallion itself, was due to a fear that they would be criticised for retaining in their own hands funds entrusted to them for distribution. If this was so, it is rather a weak reason to give, for it would surely be easy to add the 50*l*. withheld to the capital, and increase the annual grant proportionately. But this pecuniary question suggests one consideration in regard to the Soane Medallion; viz.: that the sum of money given with it is too small in proportion to what the student must expend in earning the distinction. The condition is that he studies abroad for six months and brings home satisfactory

evidence of his study. Of course 50*l.* will not go very far towards the cost incurred in six months' study abroad, and the consequence may be, and we believe really is, that clever young men with little money to spare are deterred from competing for the Soane,—which is the best thing in point of honour and importance which the Institute has to offer to students,—because they cannot afford the expenditure incurred in complying with the conditions. Fifty pounds was more in Sir John Soane's time than it is now; and if any wealthy and well-wishing person is moved to bestow some of his wealth on the encouragement of architectural study, he could not do it in a more useful way than by adding a thousand pounds to the Soane Medallion endowment, and thus rendering the pecuniary aid to the students a little more proportionate to the honour which undoubtedly attaches to success in this competition.

THE model of Professor Raschdorff's design for the proposed cathedral for Berlin is now on view in the central hall of the Kunst-Gewerbe Museum. The Minister of Public Works and several of the leading architects of Berlin inspected the model on Tuesday last, the two directors of the museum describing the plans, &c., to the visitors. The model, a beautifully-executed one, has been carried out in Professor O. Lessing's atelier according to the drawings of Herr Raschdorff, son of the Professor. The total estimated cost has not yet been stated.

AN interesting statistical paper has been published by Herr Körösi (Director of the Statistical Office at Budapest) on the Municipal Expenses incurred for Public Purposes in several of the Continental Capitals. Berlin has the highest expenses for maintenance of its fire brigade, *i.e.*, 1·69 francs per head of population; whilst the Paris brigade only costs 0·19 francs per head. Assistance to the poorer classes costs in Berlin 5·41 francs per head, in Paris half this figure, in Stockholm only 0·45 francs, and in St. Petersburg and Moscow as little as 0·23 francs; in Vienna, 9·75 francs has been the cost, owing to special circumstances. For educational purposes (lower schools), Berlin pays least, at 9·55 francs per head; Paris pays 9·91 francs, Vienna 10·99 francs, and Amsterdam 12·72 francs. The Berlin police costs wonderfully little—1·15 francs per head; Munich, however, pays still less, 0·61 francs; Paris pays 12 francs; Moscow and St. Petersburg 3 francs under this heading. Street-cleansing in Berlin only costs 1·69 francs per head; Vienna and Paris require $3\frac{1}{2}$ and $3\frac{1}{3}$ francs respectively. Whilst Paris pays 7·87 francs for hospital purposes, and St. Petersburg 2·36 francs, Berlin only pays a quarter of this last sum, and Vienna shows as low a figure as 0·54 francs. The lighting of public thoroughfares cost 0·13 francs in Berlin; this is little in comparison to Paris with 3·44 francs, Vienna with 1·33 francs, and Moscow with 1 franc. The laying-out of new streets in Paris has cost twice as much as in Vienna or Berlin, which cities both show the figure 15·65 francs. It would lead too far to go into detail. For those interested in municipal management, Director Körösi's notice will prove valuable. We may, however, mention that looking through the list of municipal debts, we find that Paris has about 780 francs per head; Stockholm, 310 francs; Vienna, 190 francs; Berlin, 154 francs; and Moscow only 11·25 francs.

AS will be seen by a report which appears in another column, the society hitherto known as "The Association of Municipal and Sanitary Engineers and Surveyors" has become "The Incorporated Association of Municipal and County Engineers." The society under its old name did a very great deal of valuable work, not only in forming a bond of union and in offering means (at its general and district meetings) for the interchange of ideas and professional experience, but in improving the status of its members, in the list of whom will be found the name of nearly every leading engineer holding the appointment of Borough Engineer or Surveyor, County Surveyor, or other chief engineering appointment under a municipal or local authority. The Association under its old name numbered some 450 members, and it is hoped that under its new constitution and name its roll will show some increase in numbers. The annual volumes of "Transactions" published during the seventeen or eighteen years of the Association's existence form in themselves a useful library of papers on sanitary and municipal engineering works, replete with details such as only the engineers who were responsible for their execution could give. Of late years the Association has very commendably established a series of examinations for those who are desirous of becoming municipal or county engineers. At the meeting on Wednesday last, Mr. Lewis Angell, the "father" and first President of the Association, read an interesting paper, which was not merely a review of the history and achievements of the Association, but a history of sanitary work during the last forty years.

WE have received an appeal from the Kent and Essex Brickmakers' Protection Association, which has appeared some days ago in some of the daily papers, on behalf of the brickmakers employed in the Kent and Essex brickfields, whose work has been stopped partially since November 25, and entirely since December 18, owing to the weather. It is stated that there is great distress among their families, that the masters have done their best to relieve the distress in their respective fields, but that the distress is so general that they feel justified in making an appeal to the public. Subscriptions will be acknowledged by Messrs. Eastwood & Co., 47, Belvedere-road, Lambeth; Messrs. Smeed, Dean, & Co., and Messrs. Wills & Packham, Sittingbourne; or by the London and County Bank, Sittingbourne.

THE case of the Burnley Equitable Co-operative and Industrial Society, Limited, *v.* Carson, which is reported in the current number of the "Law Reports," is an interesting and useful decision. It decides, according to the head-note of the case, which appears to be accurate, that "a contract of apprenticeship is not invalid by reason of the fact that the master to whom the apprentice is bound is a corporation." The curious thing is, that this important point has not been decided years ago, considering how many times youths have been apprenticed to societies and corporations. The case in question came, in the first instance, before the local justices, who held that the apprenticeship deed was invalid, on the ground that the contract was a personal one, and must be made between an individual master and an individual servant. But it is clear that a company is a recognised body, and in a sense of an individual character, so that there is no reason why it should not enter into a contract with an apprentice as much as into any other kind of contract.

CONSIDERABLE progress has been made recently in the erection of the bridge over the Thames at the Tower, notwithstanding the severe weather. The steel columns for supporting the chains at the Middlesex abutment are now being erected, while the four similar columns on the north pier are all built to the height of 90 ft. above Trinity high-water, and the girders forming the first landing are in place. On the south pier the steelwork is not so far advanced, although the four columns are being proceeded with, and it is expected that all the steel columns on both piers will be built to the full height of 140 ft. above Trinity high-water early in the Spring of this year. The large amount of ice in the Thames has prevented rowing across the river at these works for the last few weeks.

THE *Times* Berlin correspondent in a recent article on the increase of population in Germany wrongly describes the increase of the number of inhabitants in Leipsic as phenomenal, although appearances have also in Germany led to this supposition. The increase from 170,342, of 1885, to 353,272, in 1890, is due to the municipal authorities having thought proper to annex (just before the census) some sixteen of the outside suburbs to Leipsic proper, with the purpose of raising their city to the position of third in the Empire.

IT is announced that a practical examination in bricklaying will be held in June, July, and August, under the management of a joint committee of the City and Guilds of London Institute and of the Tylers' and Bricklayers' Company. The candidates will be limited to thirty in number, who must be operative bricklayers resident within the Metropolitan area. This latter restriction is made, we believe, chiefly because this examination is in the nature of an experiment, and it is desired to try it first on a limited scale. We have no information as yet in regard to the manner of conducting the examination in detail.*

PROFESSOR BANISTER FLETCHER sends us a catalogue of the King's College reference museum on subjects connected with architecture and construction. This includes over 100 constructional diagrams, and a large number of drawings and models of architecture of different styles.

WITH the view of making his skill more generally known, Mr. D. G. Hoey, on Friday, the 16th inst., invited several representatives of the press to inspect the ventilating arrangements lately carried out by him at Messrs. Barclay, Bevan, & Co.'s bank under the superintendence of Mr. J. T. Lee, the firm's architect. Mr. Hoey's work is notable for great care and attention to detail rather than for any remarkable novelty of arrangement. The banking-room, containing about 175,000 cubic feet, and 175 occupants, has its air renewed on an average $1\frac{1}{2}$ times an hour by means of a foul-air shaft, 20 ft. in area, rising to a height of 90 ft. from ground level, while the fresh air is admitted at the lower part of the room. Among the special points we may note the construction of the foul-air shaft with hollow walls, and a strong and accurately-working revolving lobster-back cowl, to prevent the wind blowing down; this is coated with non-conducting material to avoid reduction of temperature. The opening to the foul-air shaft can be closed by a small-mesh wire-gauze screen to lessen the rapidity of current, while if increased power is required, Bunsen gas-burners are provided, whose efficiency is increased by the division of the shaft into sections by iron plates 12 ft. high on which the flames impinge. The fresh air on entering is skilfully directed over the surface of the low-pressure hot-water pipes, by which the heating is performed, and admitted into the room by numerous and finely-divided currents. At the time of our representative's visit, the air of the banking-room appeared somewhat close, though less so than it has been in the past, and on proceeding to the shaft the opening thereto was found to be wholly closed by the wire-gauze screen to prevent too great rapidity and uncomfortable temperature of the incoming fresh air.

THE case of Pickering *v.* the Gun and Shot and Griffin Wharves Company is a case of demand for compensation by a workman for injury sustained while in the execution of his work, in which the rights of the claim were more evident and incontestable than they sometimes are in such actions. The plaintiff was making a ladder on the defendant's wharf; the ladder was projecting a few feet from the end of a shed which, according to

* Applications are to be addressed to the Secretary of the City and Guilds of London Institute, Gresham College.

the defendants, was erected specially to protect the men working, but there is no precise evidence as to this. While the plaintiff was just outside the shed at his work, the sling of a crane broke which was hoisting sacks into a warehouse, and the sacks fell on the plaintiff and so injured him that he was disabled from further pursuing his trade. The defence was "contributory negligence," because the man ought to have been under the shed. Mr. Justice Day quickly disposed of this by recalling attention to the main fact that the sling had broken, and no explanation of this fact had been suggested beyond the obvious conclusion that it was too weak for its work, and he invited the jury to consider whether a workman in a shipwright's yard was bound to run away from his work every time a crane passed over him. The jury replied by a verdict of 450*l.* for the plaintiff. We have not infrequently had to comment on the disingenuous manner in which claims for compensation by workmen are supported; but this is certainly an instance in the opposite direction; an attempt to evade responsibility by directing attention to a side issue.

PROFESSOR AYRTON, in a letter to the *Times*, draws attention to the injury that will be done to the laboratories in the Royal College of Science and in the City Guilds Central Institution by the proposed South Kensington and Paddington Subway. Not only will the vibration caused by the trains be ruinous to delicate operations, but the proposal to work the railway by electric power will bring this disturbing element into such close proximity as to "make even rough electrical experiments impossible." Professor Ayrton hints at one practical argument which may reach even the mind of the railway speculator, when he asks whether the promoters of the proposed scheme have ever contemplated the amount of compensation which would be demanded, if the question of compensation were once entertained?

IN *L'Art* for Jan. 15 there is an illustrated article on the celebrated Spitzer collection of Mediæval work, of which many objects were in the loan exhibition in the Trocadéro in 1889; and also notes of a journey in the South of France, with some sketches of the characteristic Romanesque churches of Puy de Dôme and the upper Loire, by M. Pierre Gauthiez.

IN our issue of August 24, 1889, we published illustrations of the staircase and garden-front of the old Manor-house at Wandsworth.* From two letters recently printed in the *Times*, we learn that the building materials of the house, including the timber, have been sold for about 370*l.* The staircase, together with the painted panels on the chief landing, had been previously removed, and the portrait of Queen Anne (from the ceiling of the room that was called by her name), the dining-room mantelpiece, and other portions of the interior woodwork, as also the outer cornice, pediments, the carved monogram, &c., have been carefully preserved. A set of sixty-two old Dutch painted tiles illustrated a variety of Scriptural subjects in chronological sequence. According to Manning & Bray's "History of Surrey," the house was, in all probability, built for one Peter Paggen, who died in 1720, and was buried in the graveyard close by. This house has played its part as the scene of some of the domestic quarrels and political intrigues which preceded the downfall of the Stuart dynasty; from it the Princess Anne wrote to her father, asking for forgiveness, and her husband another letter wherein he undertakes to take cause with William of Orange in the event of his coming to assume the crown.

AMONG our illustrations this week is a set of drawings of the porch of the fine church at Southwold, a small town which has arrived of late years at the dignity of being a fashionable watering-place, though it is not very easy to understand what are the attractions which gave rise to its popularity. The town is a tolerably large one of its class, but straggling, unpicturesque, and dirty, and reminding one a good deal of some of Crabbe's descriptions of seaside places on this coast; it lies low, has nothing attractive in its general appearance, and presents a steep shingle beach, one of the most uncomfortable kinds of beach for a watering-place lounge. Some of the older small houses facing the sea (in great request as lodgings in autumn) have a certain original character of their own; the new houses which have been recently built at the north end of the town front, in answer to the demand for accommodation, are mostly of the ugliest and most uninviting type. On the other hand one breathes an air there, "when the wind blows in from the sea," which is like drinking draughts of life, and there is very pretty country near at hand: Walberswick being a well-known haunt of artists, which in summer is dotted all over with the protecting umbrellas of sketchers. The town is reached from Halesworth junction by a short three-foot gauge line of railway of an agreeably primitive description, with carriages like tramcars, which wind up and down hill and jolt round corners as if one were driving through a country lane rather than on a railway. This approach, in summer especially, through meadows rich in flowers, is attractive enough; but Southwold itself, excepting the air and the church, is rather a disillusion.

THE Royal Academy have elected Mr. Brock, the sculptor, and Mr. A. C. Gow, the painter, previously Associates, as full Academicians. Mr. David Murray has been elected an Associate. Mr. Murray has earned the distinction, though one cannot help thinking of other landscape painters who have been longer known and whose powers are yet higher, who are most unaccountably passed over. Possibly the new Associate's patronymic may help to explain the selection. "Promotion," we are told, "cometh neither from the east nor from the west nor yet from the south," leaving obviously only one other quarter available—at Burlington House, at all events.

ROYAL INSTITUTE OF BRITISH ARCHITECTS:

THE PRESIDENT'S ADDRESS TO STUDENTS.

THE sixth ordinary meeting of this Institute for the present session was held on Monday evening last, at 9, Conduit-street, Mr. Alfred Waterhouse, R.A., President, in the chair.

Mr. J. Macvicar Anderson proposed a special vote of thanks to Mr. William C. Alexander (Hon. Associate) for his gift to the Library of twenty-six volumes of Didron's "Annales Archéologiques,"—a valuable gift.

Mr. Octavius Hansard seconded the motion, which was heartily received.

The President then read the following address to students:—

Colour in Architecture.

I have been somewhat doubtful upon what subject to address you on this the last occasion on which I shall have the privilege of saying a few words to the students from this chair; and in finally selecting as my theme the treatment of colour in architectural design, I would point out that the recent most generous augmentation of the studentship dealing with this subject affords a special occasion for attention to this sometimes neglected branch of our work. I need not remind you that on the death of Miss Jones, the last surviving sister of our late lamented and highly-gifted *confrère*, it was found that she had bequeathed all her remaining property to the very excellent studentship for the encouragement of the study of colour as a means of architectural decoration, which had already been founded by her and by another sister previously deceased, as a memorial to their brother. Though addressing myself primarily to the younger among this company, I feel that my remarks will be heard by several who may well feel it hard to listen to a discourse from one who in so many ways ought to be their disciple rather than their instructor, and to them I would say that I do not wish in the least to dogmatise in a matter so eminently one of personal taste. I will merely express some of my views as arrived at by experience, and propose, in subdivision of my subject, to speak first of external colouring, and next of internal decoration as applied both to pavements and to walls, with a special reference in the latter case to the use of glazed tiling or faience.

Until very lately, the modern school of architects gave little or no concern to colour. Drab was the genteel hue. Venetian red or yellow ochre had to be tolerated rather than enjoyed when we descended to brickwork. Lately our ideas have been revolutionised. Ruskin, with a pen which fired our imaginations with descriptions of colour-harmonies more bewitching than those which emanate from many a painter's brush, set our minds aflame for colour. Other influences in the same direction have also been at work, but the result is not always what could be desired. Two reasons may be assigned for this result: one, our national inaptitude for the task, our want of the true instinct for colour, which we see so infallible in the arrangement of dyed wools used in a Persian or an Indian carpet; or, rather, which we always did see before we forced our excruciatingly unpleasant aniline dyes upon the carpet-weavers of the East; another, our climate, which requires far more attention and care to avoid colour contrasts in violation of good taste than is needful in sunnier climes. The varied hues of a collection of ordinary Italian houses, which look right enough, and are, in fact, charming under an Italian sky, would not be tolerated in England. The fact is that bright sunshine is a great colour-harmoniser, and as we are not blessed with too much of it in this country, we ought to be the more careful in our combination and contrasts of colour. Effects of colour which have delighted us in southern latitudes have been made note of and reproduced by us at home with but sorry result, and I believe one reason for this to be that we cannot reckon on the sun putting a glaze upon our chromatic crudities. Then, again, though we must reckon without the sun, we cannot reckon, at any rate in towns, without the smoke which envelopes us with ever-increasing density; and which, after our fires are over and Spring comes round once more, we find has left its dirty finger-marks on those portions of our buildings which are most susceptible to its influence. This presents another difficulty to the chromatic artist. However skilfully he may have arranged his colours, and however satisfied he may be with the effect produced thereby when the building leaves his hands, still, if the material which furnishes one colour is more susceptible to smoke as a blackening agent than that or those which furnish others, the colour effect is changed, and, it may be, not improved.

The only material that I know of which is absolutely improved by smoke, especially if the style employed be columnar, is Portland stone; and it is a happy thing for London that its use has been so common among us, for it and soot seem made for each other, and are sure to marry happily. Harmonies in black and white, however, can hardly be called great achievements in colour. Do not suppose that I would not strive after other well-assorted unions, only in all other cases we must look upon soot as a most undesirable but certain factor whose alliance we have to do our best to defeat. The union of brick and stone, and of stones of different densities, and of bricks of different hardness, presents these difficulties: the stone and the soft brick get black, and the hard bricks retain their colour more or less in proportion to their density. Glazed tiles in combination with stone are, of course, quite inadmissible for the above reason, and even polished granite combined with freestone is of doubtful expediency. Emery-polished granite, which secures for the material all its colour, without that reflecting surface which mars its repose and prevents its happy union with the surrounding stonework, is to my mind, when granite is to be employed, by far the best suited for exterior effect. Highly reflecting surfaces kill form, and so do colour contrasts to a certain extent. We may conclude to prefer a colour effect to the distinct discernment of form, and do so rightly in certain cases, but we must, I think, always know when we are sacrificing form to colour: it must be done from choice and not by accident; and when changes of colour are introduced into forms

* See also the *Builder* of June 22, 1889, "Surrey Archæological Society: Meeting at Wandsworth;" and our "Note" of May 11, same year.

which are studied, and intended to produce a definite effect, the disturbing effect of the colour should always be taken into consideration.

It is a most interesting question to us how far the application of pigments on the buildings of antiquity enhanced their beauty. Judging, for instance, from some of the learned polychromatic restorations of the holders of the French Grand Prix de Rome, I should prefer Greek Temples in their present aspect to their effect when bedizened with their pristine splendour of colour; but, perhaps, after all, the student with all his research may have been mistaken, not as to the use of polychromy (that cannot be doubted), but as to its exact application. On the other hand, there are fragments of Greek buildings bearing original colour, as for instance certain bits in the Museum at Palermo, which give one nothing but delight. Again, one is tempted to feel that the Mediæval art, which happily still survives in this country and France, could not have been always improved by the colour with which it was frequently overloaded. I prefer its present aspect; but it must not be overlooked that time has been busily at work not only in the effacement of the original pigments, but in treating the work with a colour decoration of its own in the way of lichen and weather stains.

Former ages, even the most refined, were not only tolerant of excess of colour, but delighted in it in a way which would be repellent to our present peculiar phase of civilisation. Compare the sobriety of colour which characterises the works of this generation of painters with those of the artists who flourished before Raphael, and you will see what I mean. I do not assert that all colour must be abandoned in this critical age, but that it has to be used with reserve and judgment if it is to find acceptance with the phase of cultivated taste peculiar to the present day. Violent contrasts should, perhaps, be avoided, and most certainly discordant ones. There are two strong contrasts which always, I think, affect us agreeably: the black and white marble of the Italian Gothic churches—as that at Genoa, and the yellow and red of Verona and its neighbouring cities. But what we call white is now yellow, and the colours which look well in S. Zenone are not so satisfactory when adorning a chapel in Paddington or Bayswater. As I said before, England is not Italy.

The scientific exploiters in clay are now able, out of the same clay, to get two or more different colours on the same block. They do this by increasing the proportions of some of the natural constituents of the clay affecting the colour (the iron and the alkalies), by the addition of soluble forms of either element. These additions can be localised by limiting the evaporation of the soluble elements to certain spaces. Colours so obtained will, I believe, invariably harmonise with each other. Perhaps in this way, in developing the resources of the clays beneath our feet, and in the blocks of terra-cotta made from them, we may aim, with the aid of science, at subtle and agreeable changes of colour, securing a surface so dense as to be proof against atmospheric destruction and disfigurement; and at the same time avoid reflecting surfaces which, if periodically washed, would disturb the eye by their glitter. It appears to me that this is the direction in which the future external colour decoration of our city architecture must develope.

I am hardly able to explain what it is within me which rebels against marble statues against a stone front; it is more than the mere incompatibility of the two materials, which when new never agree, and which causes the statues, when the stone has attained its full measure of sooty disfigurement, to look almost ghastly in their cold obtrusiveness, and which serves only to teach us this lesson, that glaringly light objects destroy the forms of the features against which they are set. Less offensive is the still objectionable practice of using a lighter coloured stone for statuary against the darker stone of the building. I have seen red Mansfield Woodhouse stone so used against ordinary dark red sandstone in a work which seemed to me, with this exception, of great merit; but such a contrast of colour in a work where no colour contrast was intended did something to destroy the unity of an otherwise admirable piece of work.

Coming to floors, I suppose the most satisfactory pavements the world has ever seen are those composed of slabs of purple porphyry and green serpentino, surrounded and set in bands and interlacing circles of white marble; smaller patterns of these three colours, almost always severely geometric, being interspersed to give interest and complexity to the whole and enhance the apparent dimensions of the larger pieces. Nothing of the kind that I know of is equal to this *Opus Alexandrinum* in beauty and fascination, in the splendour and costliness of the materials, and the depth and refinement of their colour, of a contrast just strong enough to bring out each other's attractions, and yet not destroy the harmony of the whole pavement. No doubt the stains of the softer white marble which age has brought with it make some of the floors of the earliest Italian churches and basilicas even more lovely now than when they left the lapidary's workshop. We have one well-known example at home in the shrine of the Confessor in Westminster Abbey; but such sumptuous pavements can now be only rarely indulged in. The introduction of other marbles and other colours is nearly certain to lower the character of the pavement, but perhaps the most harmless admission to this matchless combination of purple, green, and white is *giallo antico*, as one element in the smaller geometric patterns.

The manufacture of tiles for pavements has been almost ruined by the folly of their makers in pandering to the undeveloped taste of a public delighting in gaudy and inharmonious colouring, so that cultivated people shudder at the very mention of them; but I need hardly say that there is nothing in tiles, the manufacture of which has now been brought in England to very great perfection, which will not lend itself to very beautiful arrangements of colour both for floors and walls, if architects gave themselves the trouble to study the effect of the tiles themselves upon each other before their final selection. No coloured drawing can with safety be relied upon. This precaution, of course, is as necessary for wall tiles as for those used in pavements.

In place of tiles, the revived *opus insertum* of the Romans has lately come much into vogue among us. The beauty of these pavements of small marble tesseræ principally arises, I suppose, from the softness imparted to them by the slight variation of colour in the so-called white marbles. Black and Sicilian marbles are the kinds ordinarily employed, and none are more effective, with perhaps central panels of some dark red limestone where depth of colour is desired. The principal objection to the employment of this *opus insertum* is the softness of the Sicilian white or grey marble, which consequently wears down much more quickly than the black or red; so that I have known a pavement subjected to much traffic which had to be renewed in less than twenty years. A floor of tile tesseræ, on the contrary, is very permanent, but is much harder in tone than those of marble. This could, perhaps, be overcome if the manufacturers would give us twenty different shades of ivory and pearl to use for our so-called white spaces instead of a uniform snow-white, and if their reds and blacks also were supplied in similar variety. I believe then that our actual prejudice against pavements of ceramic tesseræ would speedily disappear, and that we should be able to combine arrangements of this very permanent material at comparatively slight cost which would satisfy a fastidious taste. Glass tesseræ are open to the same objections as those made of tiles, but are capable of the same judicious treatment. Some very fine combinations of blue and grey are already to be seen. The advantage of greys of various tones in place of pure white may be seen in any bit of Gris de Flandres ware. Cover the greys of half such a pot with a coating of Chinese white, and the value of the grey will soon become apparent; or even look at the sky; its blue, when interfered with at all, is, in broad daylight, interfered with not by *white* clouds, but with vapour not only of indefinite variety of form, but of varying quality and intensity of grey, sometimes so warm as to approach orange, and sometimes as cold as pure indigo, but always grey as compared with the blue vault of heaven over which they sail.

I have reserved for the close of my few remarks on colour as a vehicle of architectural expression what I have to say on the use of faïence in this connexion. I alluded to this subject in my address at the opening of this session, because I cannot help thinking that the architect ought to impress his building permanently with his own ideas as to its becoming colour, just as he does as to its appropriate form, and I see no way of doing this so satisfactorily as by the use of faïence, certainly internally, and it may be in certain cases in towns externally also. I say in towns, because I suppose we should never wish to use in a pure atmosphere a material on which nature, as time goes on, could not leave here and there her delicate pencilling. It would be foreign to my present subject to enlarge on the dangers to be guarded against in the use of faïence; of the necessity for the greatest care, where it is not structural, that the backing should be of quick-setting cement, so as not to allow of undue absorption by the brickwork of the wall behind before it has time to set; and also on the necessity for grooving or roughing the backs of the tiles themselves to secure thorough adherence to the rendering. What I would here insist upon as connected with our theme,—for I am one who has been taught by bitter experience,—is never to trust to a mere drawing in the colour combinations: always to insist on seeing the faience blocks and tiles themselves in juxtaposition, remembering, however, that arrangements of colour which appear perfect in single pieces, will really be far too strong when you get them in a mass upon your walls. This is the hardest lesson to learn, I have not learnt it yet in practice, but I have observed that the treatment of some small room whose modest dimensions have demanded the very faintest contrasts of tint and tone, has, in consequence of this treatment, given me much more satisfaction than the arrangement of colours in larger apartments where a more ambitious combination of colour has been attempted. The actual scheme of colour in each case must be left to your own good taste and imagination, avoiding absolute white—unless it may be very small quantities—and strong contrasts, as destroying breadth, repose, and scale. My own predilections are for pearly greys and drabs inclining to ivory, red or green, with very small points of delicate turquoise blue; but, as I said before, I would not dogmatise in any way.

Nor will I take up your time with saying anything about what we may do with different woods in our joinery and cabinet-work, and in the way of tarsia work in each of these: except to remind you that there are several examples of the latter work at the last Exhibition of Arts and Crafts, some of the most ambitious, in my humble judgment, sadly overloaded with ornament. That shows, in my opinion, the advantage of the architect's direction in such work. He may not be able to design an arabesque panel better, or perhaps as well as an artist who devotes his life to such work; but he may know, and generally does know, where to stop. It is infinitely better to have too little ornament, if that little be but the outcome of our best thought, than too much. In the embroidery room of the same Exhibition the same thought struck me. It was those pieces, and those only, in which, the forms being well studied, the colours were delicately combined, which one would have liked to take home with one and live amidst.

I must not close my remarks without a final word on the subject of glass. Windows are made to admit light, and, where there is anything of a pleasure-giving character outside, to see through. When these two objects are sufficiently attained we are better off with an 18-in. brick wall between us and the heat or cold of the exterior than with more glass. When we do not want to see through our windows they may be filled with glass more or less coloured. Now here is another pitfall awaiting us: our clients sigh, it may be, for something which they call cheerful—that is, glass of glaring colour—and if you are not made of sterner stuff than I have sometimes found myself composed of, they will have it at your hands, or get it elsewhere. Whereas, if they only knew beforehand what would really satisfy them, they would have been glad of something more approaching in colour an opal or a pearl. Of all the stained glass with which the churches of this country have been flooded within the last half century, there is not one bit in a hundred that could not very easily be spared. In the majority the drawing is bad, the sentiment is mawkish, and the colour, which is the real excuse for shutting out the cheerful light of day, is the worst thing about these stained-glass windows; and yet there they are for all time, unless conflagrations, or another revolution conducted like our first by iconoclasts, intervene to rid us of them. The old glass we could ill spare; but, with some few rare exceptions, it is different as

regards that which has succeeded to its place of honour.

Of the work of the decorative painter, of subject-pictures on walls or ceilings, in fresco or spirit medium, and of mosaic pictures, I will say nothing because time is too short. I will content myself by recommending those of you who have not yet been to Sicily, and who have a desire to prepare your thoughts for service in the direction we have been turning our thoughts to-night, to visit Palermo and Monreale, where you will see the most splendid and at the same time the most refined interiors that I suppose we have any knowledge of. This Saracen work, under Norman guidance, glows with colour like the rainbow, but there the similarity ceases, for it is as permanent as the latter is evanescent. Tall slabs of Cipollino clothe the lower parts of the walls for about 15 ft. with an ever-changing embroidery of greenish grey; then comes a horizontal band of white marble with inlay of glass mosaic in the form of pines, and in geometric patterns, like those on the tomb of the Confessor. The same bands surround the doorways. Above all this, on walls, vaults, arches, and window recesses, there is nothing but glorious mosaic pictures, generally on gold ground, every angle rounded to carry this splendid material.

We cannot hope to repeat such glories except on very rare occasions, and on a small scale, but they form one of the architectural sights of the world. Let it suffice for us to bring a delicate sense of refinement to our work, and give our best thought to the application of our colour, as we already do to the design of our plastic work. In this direction we have a chance of our handiwork being somewhat original, as we may go to nature for our colour motives to a greater extent than we can for our forms. An afternoon at a museum among shells and birds need not be thrown away upon the student of colour. He will there find many subtle harmonies that have never been attempted in human work; he will thus draw his inspiration from the highest source, and adorn the surface of his architecture with colour combinations never before attempted for such a purpose.

Professor Aitchison, A.R.A., at the conclusion of the address, said he had personally to thank the President for his most fascinating discourse, which was full of suggestiveness. They were also under deep obligation to him for pointing out those pitfalls which beset the use of colour. He had only this to say on the subject of architectural colouring, which was, that although he greatly admired the profession for its utter disregard of remuneration, still if they had to design the arrangement of colour as well, they would be even in a worse position than they were at present, for they now were the poorest of all the professions. The only thing he would say about colour, which was a charming study in itself and excellent for every one who could afford the time for it, was, that there were only a few to whom the gift of colour was vouchsafed, and that those who did not possess the gift, when they used it, were simply a misfortune to the rest of mankind. He would also say to persons who attempted to deal with colour, that unless they thought it of paramount importance they should by all means withhold their hands from it, and study whatever other subject they felt they had a bent towards. The very idea that the houses in this dusky city, and in the still duskier provincial manufacturing towns, would show splendour of colour, and be of material which could be washed with a sponge, was a most fascinating one, and one he had been long hoping for. He was afraid, however, that he would not see it in his time, though the younger generation, he believed, might live to see it. Then, instead of dusky, smoky, and miserable-looking cities, they might be as splendid as M. Charles Garnier hoped Paris would become, if proper attention were paid to the use of enamelled pottery and glass mosaic. He quite endorsed the President's remarks on the splendour and admirable effect of *opus Alexandrinum*, and he thought a tribute was due to the unfortunate Emperor, Alexander Severus, who was the originator of its use. Of course, in a poverty-stricken country like this, we could not expect to imitate the things which were done by the small republics of Greece or Italy. Still, something might be done one day, when England became rich, and, in that case, he did not know any better material than *opus Alexandrinum* for the pavement of large halls and churches. As the President had said, the great point of the whole design was, that there were squares or circles of green or red porphyry, and round those were *guilloches*, or straight bands filled with triangles and squares of red and green porphyry, and occasionally with black and *giallo antico*. Porphyry of all shades of colour existed in Sweden, Norway, and Denmark, and the advantage of using it for outside work in this climate was that it did not perish, and that in pavement it was polished by the foot, whereas marble only scratched, losing to a great extent its colour and value in the combination. As far as pottery was concerned, all who might visit France should take the opportunity of seeing the grand frieze brought by M. Dieulafoy from the Palace of Darius at Susa. This frieze showed what might be done by using so common and cheap a material as brick, the colour in it being quite a study for what monumental colouring should be. It was, however, intended to reflect the bright sun of Persia, and would have to be modified to suit the gloom of this country, but it would be seen how very few colours had been used, and those not of the most brilliant description, and yet a majestic effect had been gained. With respect to ornament, if a man did not know exactly how to use it, he should by all means avoid it as much as he could, and not put in anything which made a flat wall worse than it was before. On the other hand, if a man was a master of the art, he could not have too much of it. It was just the same as in war—a poor general might only be able to handle a small army, but if he was a great soldier, the larger his army was the more absolutely certain would be his success. Those who had the real mastery of colour, therefore, might use it with the greatest profusion. There were many remnants of mosaic in various parts of the world, and although he had made use of it in rooms, and he hoped with tolerably good effect, yet it was a monumental material, and as such should be generally used in large buildings, and at some considerable distance from the eye, because, although the outlines of it might be made almost as perfect as a drawing, yet, generally speaking, it was rather rough, and required distance to make it perfect. He had long hoped to see the backs of the porticoes in London, and in the principal provincial towns, resplendent with mosaic. The most beautiful examples of mosaic he had seen were those of San Vitale, and the Tomb of Galla Placidia at Ravenna. The groined ceiling over the altar at San Vitale was, to his mind, the most lovely piece of ornamental work he had seen, and the magnificent figure-work in some of the panels was beautifully done. There were also very fine specimens to be found elsewhere, at St. George, Salonica, and at "the Monastery in the Country" at Constantinople. The two large slabs of mosaic at the back of the altar at San Vitale, the one representing Justinian and the other the Empress Theodora, were two of the finest mosaics he had ever met with. Professor Aitchison concluded by proposing a vote of thanks to the President for his excellent address.

Mr. Purdon Clarke, C.I.E., seconded the motion. He said he rather deprecated the idea that the infamous climate of this country should prevent the use of bright colour, because he believed bright colour might be used, which would harmonise with the atmosphere of sooty London. He had had the fortune to see some of the brightest colouring, not only under the bright skies which were so common in Italy, but also under very different aspects. He had resided in Rome and Venice for considerable periods, and had seen fogs in both those cities. In fact, he could affirm that he never saw St. Mark's at Venice look better than in a thunderstorm. He remembered one occasion when the weather was almost as murky as it could be in London, but the way in which the gold tesseræ and bits of bright blue here and there flashed through the darkness was such, that he felt that if the whole thing could have been transported to London, it would have done a great deal to brighten even our darkest days. He had heard the colour of the Alhambra spoken very much against on account of its crudeness, but excused with the remark that it did very well in Spain. He believed the weakness of the imitations had always been caused by the want of paying proper attention to the qualities of the colours. Even in the matter of vermilion, there were many shades, and its selection was not a thing to be left to the workman. With regard to the question of mosaic, the modern makers had been very much to blame. In 1872, when he returned after two years' work in the Basilicas of Italy, he could only get gold tesseræ in England, or even of the Salviati make, of a perfectly uniform shade, like yellow looking-glass; but the old tesseræ were found to vary very much in tone. The modern glaze was very thin, and of a uniform thickness throughout; the old varying, on the contrary, from $\frac{1}{35}$nd of an inch to $\frac{1}{10}$th of an inch over the gold. It was in the varying thickness of the glaze that the beauty consisted, it being like hammered gold compared to something rolled out on a machine. The green, too, was varied from the green through to the blue, with scarlet smudges here and there, which all added to the effect. They had still a good deal to find out about the colours which were used, and the methods of their application. He believed Colonel Jacob could tell them something of the mediums used in the bright fresco colouring of Jeypore, where they produced frescoes equal to anything that was found in Pompeii, especially in the mediums for making reds. Red lead was used largely in the East, and he had seen it in places close to the smell of bad drains, and yet there it had stood good for a hundred years. In this country red lead was considered to be a colour which would not stand; but it seemed that in India the natives had methods of making it permanent.

The vote of thanks was then put and carried by acclamation.

Presentation of Medals and Prizes.

The President next presented the prizes to the successful competitors, a list of whom appeared in our columns last week.

Mr. Charles Barry, at the close of the presentation, said it was a matter of regret that none of the designs sent in for the Soane Medallion had been deemed sufficiently good to absolutely merit entire success; the money, therefore, only had been divided. He believed that in this competition the Medal was considered of more importance than the money; and he therefore hoped that the Council might see their way to present some kind of testimonial in the shape of a medal of merit or a certificate to the recipients of the money this year.

The President said that the Council would give their consideration to the matter.

Architectural Details from Jeypore.

The President then introduced Colonel Jacob, who, he said, had attended at the invitation of Mr. Barry, and who would be willing to tell them something about the work done at Jeypore in educating the native workmen,—the draughtsmen who had produced the Jeypore portfolios of architectural details which had been presented to the Institute by the Maharajah of Jeypore.

Colonel Jacob, C.I.E., of the Bombay Staff Corps, said that it was more than thirty years since he went from England to India, and it was rather a formidable thing to find himself now in the presence of such an audience, especially as he had not had the privilege of being brought up as a professional architect. He might say that he had a great desire to be one, and although he went out originally in the Artillery, fortune had led him into the Public Works Department,—not that that was, perhaps, always a thing to be desired, still it was the groove which gave him a start in Jeypore. Fifty years ago there was not a road there, and even twenty-five years ago one often had to ride on camels or horses. Through the liberal policy of our Government, public works had been fostered, and through the liberality of the Maharajah, and his desire to make his State occupy its proper place as one of the leading States of Rajpootana there were now not only 250 miles of metalled road but also waterworks with a constant supply which had been the free gift of the Maharajah to his people. There are more than 100 irrigation works of all sorts; there had been erected two large cotton presses, gasworks, excellent public gardens, a large hospital, and about twenty-five dispensaries in the Districts. And now, thanks to the liberality of the Maharajah and the great interest which has been devoted to it by the Civil Surgeon, Dr. Hendley, C.I.E., there is an excellent museum. In commemoration of the visit of the Prince of Wales a building had been constructed called the Albert Hall, which he had been asked to superintend. As the building was intended to be a museum, it was considered that it would be interesting to intro-

duce, where circumstances permitted it, in the details and in the decoration, good examples of Oriental art, so that the walls themselves might be part of the museum, and many instances of beautiful work in Delhi and Agra had been made use of. The Archæological Department of India had done a great deal to preserve the old buildings, and had given plans and sections of many of the most important of them. At the same time, we could not afford to erect such buildings now, and the details which the Archæological Department had given were often on such a small scale as to be almost useless for practical purposes. What occurred to him was to make use of some of the details which were already existing, and to put them into such a shape that they should be useful also to others. The building material in Jeypore was chiefly marble. There was a great deal to be gained by taking the workmen into one's confidence, and showing them that one was trying to do something which would be true and beautiful. It might be interesting to say how the native workmen made copies of the details. They first took the paper and drew the pattern with a pencil, pricking it through, placing it on the surface, and dusting it with a bag of powdered charcoal. This went through, and when the paper was removed there was a dotted outline, which could be pencilled in. If this were done on marble, the surface was first covered with red ochre, and when the dotted lines were scratched in there was left a white outline on the red ochre. When the building was finished, the Maharajah was kind enough to sanction the drawings being reproduced by photo-lithography, and a copy of the whole has been presented to the Royal Institute of British Architects. The interest which attached to these drawings was that they were entirely the work of native artisans. These drawings had been executed by the sons of masons, and he believed it would be difficult to get any English masons' sons to draw such things. It showed the influence of early training in drawing. Colonel Jacob desired to say how much was due to Mr. Cosens, of the Archæological Survey of Western India, who allowed the Jeypore draughtsmen for three months to attend his office in Poona, and personally instructed them how to ink in the work. Nor did he forget the help which had been so kindly given by Dr. Burgess, Superintendent of the Archæological Survey of India, and other friends. In conclusion, Colonel Jacob added that much more might be said, but his chief object in coming forward that evening was, not to make a speech, but to express his thanks to the President and the Council for the encouragement he had received in the very kind way in which they had accepted the copy of the "Jeypore Portfolios of Architectural Details," which he had had the honour to present to the Institute on the part of H.H. the Maharajah of Jeypore, and also for the permission to exhibit the specimen drawings on the screens that evening.

Mr. William Simpson said he had been to Jeypore twice, and had seen some of the buildings erected for the Maharajah. The great interest of the drawings exhibited that evening on the screens was that they were the actual work of native artists, and the closest inspection even only showed the marvellous delicacy and steadiness of the lines. They had not quite our English ideas of art, but in ornament they surpassed us. He wished the other rulers of India would follow in the steps of the Maharajah of Jeypore by giving details of Indian architecture. His only grumble was that there was in these works too much of the later Mohammedan work,—what he might term the Shah Jehan ornament, when the European influence had come into India, and which the natives had never got well into assimilating. There was just a little too much of that in these books, and he should have preferred more of the old Hindoo art, of which there were plenty of specimens in Rajpootana. He would therefore ask Colonel Jacob, on his return, to give them the old Hindoo work, and not so much of the work of the Shah Jehan period. The publication of the portfolios was an event in the history of Indian architecture, or in the study of it. The plates numbered 375, and were a magnificent addition to the knowledge of Indian archæology and art. He proposed a cordial vote of thanks to Colonel Jacob.

Mr. Purdon Clarke seconded the motion, and added that in many instances the original drawings looked better in this climate than the actual casts. Delicate work in relief, which in India looked perfect, in London, owing to the want of sharpness of light, seemed gummy and indistinct. The drawings, however, gave the effect of the strong sunlight which in India made the sharp shadows. It was a reproach to our Government that after 200 years of British rule in India, they had so little to show in this direction, and that the first wise gift should have been made by a native ruler. With the exception of the first part of a work by Major Cole, which the Indian Government did not continue, and Fergusson's excellent book on India, they had little to show, while Napoleon, during the short time he was in Egypt, and notwithstanding his military occupations, promoted the production of a wonderful work on that country.

Mr. Charles Barry added that it ought to be known that the interest taken by the Maharajah of Jeypore in these matters had been largely due to the influence of Major Jacob.

The vote of thanks was then adopted, and Colonel Jacob suitably replied.

The President announced that the next meeting would take place on the 2nd prox., when a paper would be read on "The School of Bramante, and its Expansion through Europe," by Baron Henry de Geymüller (Hon. Corr. Member).

The proceedings then terminated.

THE ARCHITECTURAL ASSOCIATION.

THE adjourned special business meeting of this Association for the consideration of such of the By-laws as had not been already passed* was held on Friday evening, the 16th inst., Mr. Leonard Stokes, President, in the chair.

There was a very thin attendance, and it was only after the lapse of some little time that the necessary quorum of twenty-five members was got together.

The President announced that as Mr. Stannus was unable to be present, owing to the inclemency of the weather, he would ask Mr. Hampden Pratt to formally move the adoption of the By-laws as yet undealt with, beginning with number XXI., which was as follows:—

"21. All moneys belonging to the Association, and not invested, shall be deposited by the Committee, on account of, and for the use of, the Association, with a banker, in the county of London."

Mr. Farrow seconded the motion.

Mr. Brodie moved as an amendment that the word "Treasurer" be substituted for the word "Committee," and that a transposition be made in two of the sentences of the By-law as drafted, so that in its amended form it should read as follows:—

"21. All moneys belonging to the Association, and not invested, shall be deposited by the Treasurer with a banker in the county of London, on account of, and for the use of, the Association."

The By-law as thus amended was agreed to.

Mr. Pratt moved the adoption of By-law XXII., as follows:—

"22. The Librarian shall, subject to the control of the Committee, have charge of the Library; and shall render a financial account and report to the Committee at the close of each Session."

Mr. Farrow seconded the motion, which was agreed to without discussion.

Mr. Pratt moved the adoption of By-law XXIII., which as presented by the Committee read as follows:—

"23. The duty of the Committee shall be, to conduct the affairs of the Association, to report to the general body of Members at the close of each Session, and to issue to Members, not later than the first week in September in each year, the publication known as the 'Brown Book,' which shall contain, besides the Report of the Committee, and the Balance-Sheet for the past Session, a complete list of the arrangements made for the Session."

Mr. T. E. Pryce seconded the motion.

After a brief discussion certain verbal amendments were agreed to, and the By-law, as adopted, reads as follows:—

"23. The duty of the Committee shall be to conduct the affairs of the Association; to present the Annual Report to the general body of members, and to issue to members, not later than the first week of September in each year, the publication known as the 'Brown-book,' which shall contain, besides the report of the Committee and the Balance-sheet for the past session, a complete list of the arrangements made for the current session."

On the motion of Mr. Pratt, seconded by Mr. Pryce, By-law XXIV., as follows, was agreed to without discussion:—

"24. The retiring Committee shall, at the last meeting but two of each Session, bring forward a list of Members willing to serve as Officers for the ensuing Session; to which, upon nomination by any two Members at the next succeeding meeting, may be added the names of other Members willing to serve; and this shall be the Voting List for the Election. Scrutineers shall be appointed at this Meeting to count the votes prior to the next meeting."

Mr. Pratt next moved, and Mr. Farrow seconded, the adoption of By-law XXV., as follows:—

"25. Voting papers, containing the names in alphabetical order, of all persons nominated to the various offices, shall be forwarded to all Members whose subscription is not more than one Session in arrear. The Voting Papers shall be filled up and returned to the Secretaries on the date mentioned therein, and they shall hand them unopened to the Scrutineers, who shall count the Votes and report the result of the Election at the last General Meeting of the Session."

This was unanimously agreed to.

On the motion of Mr. Pratt, seconded by Mr. Farrow, By-law XXVI. was agreed to, as follows:—

"26. The office of President or Vice-President shall not be held by any Member for more than two consecutive years. Of the ten ordinary Members of the Committee not more than seven shall have served in the same capacity in the preceding year, and no ordinary Member of Committee shall serve as such for more than three consecutive years."

Mr. Pratt moved and Mr. Earle seconded, the adoption of By-law XXVII., as follows:—

"27. If a vacancy shall occur on the Committee, notice of such vacancy shall be given to the general body of Members; and after the lapse of two weeks, the Committee shall, at a General Meeting, nominate a Member to fill such vacancy. At this meeting any two Members may add the names of any other Members willing to serve; and the election shall take place by show of hands at the next General Meeting."

This was also agreed to.

Mr. Pratt moved the adoption of By-law XXVIII.

Mr. Pryce seconded the motion, and, after a few words from Mr. Hudson, the By-law was unanimously agreed to as follows:—

"28. Two Auditors, whose sole duty shall be to audit the Accounts for the Session, shall be elected annually at the same time, and in the same manner, as the Committee. The Auditors shall not be upon the elected or retiring Committee. One only shall be eligible for re-election; and neither shall hold office more than two consecutive Sessions."

Mr. H. W. Pratt moved the adoption of By-law XXIX:, as follows:—

"29. The Committee shall have power to appoint an Honorary Solicitor, a Registrar, two Assistant-Librarians, and any paid officials to assist in the work of the Association at such remuneration as may be deemed expedient."

Mr. F. T. Baggallay seconded the motion, which was carried.

Mr. Pratt next moved, and Mr. Farrow seconded, the adoption of By-law XXX., as follows:—

"30. A Register shall be kept of the names of architects requiring assistants, and of assistants requiring engagements. This shall be free to all Members, but a fee of one shilling shall be charged for the registration of non-members."

This was agreed to, as were also By-laws XXXI. and XXXII. (each being moved and seconded by Mr. Pratt and Mr. Pryce respectively), as follows:—

"31. The Ordinary General Meetings shall be held from October to May; as far as possible, on alternate Friday evenings, commencing at half-past seven o'clock, and concluding as near half-past nine as practicable. Papers shall be read and Discussions take place at these Meetings. Each Member shall have the privilege of introducing one visitor, either personally or by ticket."

"32. The first General Meeting of each session shall be the Annual General Meeting; at which an audited statement of the accounts of the Association shall be laid before the Members; together with the Report of the Committee for the previous session, for the consideration of Members; the prizes shall be distributed; the President shall deliver an address; and short addresses be also invited from senior Members of the profession."

Mr. Pratt then moved the adoption of By-law XXXIII., as follows:—

"33. A Special General Meeting shall be called by the Secretaries when required by the Committee; or at any time not less than two weeks, nor more than eight weeks, after the receipt of a requisition, stating the purpose for which the Meeting is required, and signed by twelve Members. The presence of twenty-five Members shall be necessary to constitute a quorum at any such Meeting; and in either case the Agenda of business to be considered shall be duly advertised at least one clear week prior to the Meeting; and no other business shall be taken at such Meeting."

Mr. T. E. Pryce seconded the motion.

To this Mr. Cresswell moved, and Mr. Hudson seconded, an amendment to insert the words, "one or more of the professional journals," after the word "advertised."

This was lost, it being explained that that course was quite open to the Committee under the rule as proposed.

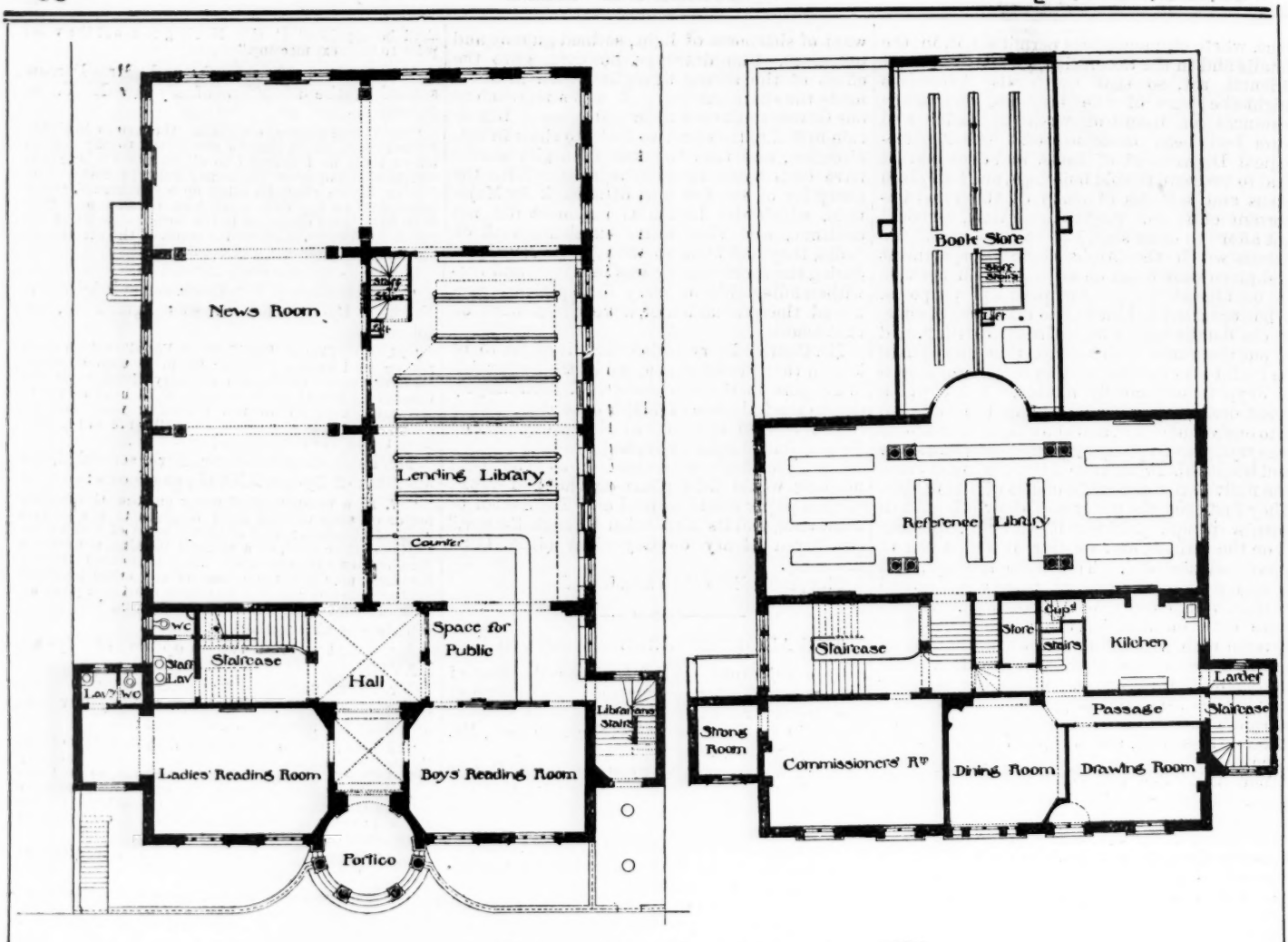
The original proposition was then agreed to.

Mr. Pratt next moved the adoption of By-law XXXIV., as follows:—

"34. The Session shall commence on the first day of June in each year; and terminate on the last day of May in the year following."

Mr. Earle seconded the motion, upon which a long discussion ensued as to the advisability of continuing the annual *conversazione* of the

* For the reports of the previous meetings, see the *Builder* for December 20 and 27 last, pp. 480 and 496.



GROUND PLAN. FIRST FLOOR PLAN.

Chelsea Central Library: Plans.

Association, and whether or not words should be inserted in the By-law giving the Committee power to hold a *conversazione*.

Mr. Leverton complained of the increasing expenditure of the *conversazione*, and that the character of the entertainment provided had not kept pace with the increased outlay upon it. At the same time he did not wish to see the *conversazione* altogether given up, and he therefore moved as an amendment to insert the words "A *conversazione* may be held at the beginning or end of each session."

This amendment was lost, it being explained by the President that the Committee already had discretionary power in the matter.

After some further conversation, the motion for the adoption of the By-law as above set out, was agreed to.

Mr. Pratt next moved the adoption of By-law XXXV., as follows:—

"35. The Committee may alter the dates of Meetings, but they shall announce all changes of arrangement, and Special General Meetings, by advertisement, in one or more of the professional papers."

Mr. Farrow seconded the motion.

Mr. Baggallay moved and Mr. Cresswell seconded as an amendment that the By-law should read as follows:—

"35. The Committee may alter the dates of meetings, but all changes of arrangement shall be duly advertised."

The amendment was carried.

Mr. Pratt next moved the adoption of By-law XXXVI., as follows:—

"36. All voting shall be taken by show of hands, and the question decided by the majority, except as herein provided to the contrary. In any case of equality the Chairman shall have a casting vote."

Mr. Pryce seconded the motion, which was agreed to.

The Chairman next moved the adoption of By-law XXXVII., which, as originally drafted, read as follows:—

"37. Any alteration or amendment to the Constitution or By-laws of the Association shall be proposed in writing by at least twelve Members, or by the Committee, at a General Meeting; discussed at a Special General Meeting held not less than two weeks or more than eight weeks subsequently, due notice of which has been given; and voted upon at the Meeting by a show of hands."

The Chairman explained that it had been found necessary to remodel this By-law, so as to make it agree with Rule XII. of the Constitution, which had already been passed.

After considerable discussion relating to verbal amendments, By-law XXXVII. was finally agreed to in the following terms:—

"37. Any alteration or amendment to the Constitution of the Association shall be proposed in writing by at least twenty members, or by the Committee at a General Meeting; discussed at a Special General Meeting held not less than two weeks, or more than eight weeks, subsequently, due notice of which shall have been given. The proposal in its final form shall be voted upon by means of voting papers, which shall be sent, together with a full report of the discussion, to all Members. These voting papers to be returned to the secretaries, who shall hand them unopened to the two scrutineers who shall be appointed by the Special General Meeting. The result of the voting to be made known at the next General Meeting. No alteration or amendment of the Constitution shall be carried unless by a two-thirds majority of those so voting."

The Chairman said that it would be necessary to pass another By-law not included in the By-laws as originally drafted, which would be By-law XXXVIII., which, on behalf of the Committee, he begged to move as follows:—

"38. Any modification of the By-laws shall be proposed and discussed in like manner as provided in By-law XXXVII.; the final voting being taken by show of hands at the Special General Meeting at which the proposed modification is discussed. But no alteration shall be carried unless by a two-thirds majority of those so voting."

This was agreed to unanimously.

On the motion of Mr. Pratt, By-law XXXIX. was unanimously agreed to. It reads as follows:—

"39. The Constitution and By-laws as herein contained, and as hereafter amended or enlarged, shall be binding on all Members; and their membership shall be taken as assent thereto."

By-law XL., the last on the list, was then, on the motion of Mr. Pratt, also agreed to. It is as follows:—

"40. The form of application for Membership shall be that appended hereto."

[NOTE.—The present Form of Application for Membership, to be altered, on lines 11 and 12, in 'Brown Book,' p. 17, to: "I hereby agree to pay the sum of *Two Guineas* as an Entrance Fee, together with the First Annual Subscription of *One Guinea*." The third line from bottom to be: "Every Nomination Paper *shall* be accompanied by a letter, &c."]

After one or two amendments, having for their object the insertion of By-law IX. (relating to the amount of Members' subscriptions) in the Constitution had been discussed and defeated,

Mr. Cresswell moved and Mr. E. S. Gale seconded, "That the Constitution and By-laws as passed be agreed to as a whole, subject to any verbal revision which the solicitors of the Association might advise."

The motion was unanimously agreed to.

On the motion of Mr. Baggallay, seconded by Mr. Pryce, the old Rules of the Association were declared to be rescinded, and the proceedings concluded with a vote of thanks to the Revision Committee for the time and care which they had devoted to the subject.

Illustrations.

THE CENTRAL LIBRARY, CHELSEA.

THIS new building, which has just been completed, is in Manresa-road, Chelsea. It is built of red brick, with stone dressings, and the roofs are covered with tiles. The ground-floor comprises a large news-room for 200 readers, a lending-library, and ladies' and boys' reading-rooms. On the first floor is the reference-library, the book-store, the Commissioners' room, the Librarian's residence, &c. In the basement is the caretaker's residence, the work-room, and other store-rooms.

The building has been carried out from the designs of Mr. J. M. Brydon, F.R.I.B.A. The general contract has been taken by Messrs. Holloway Bros., of Battersea; the fireproof floors are on Messrs. Homan and Rodger's system; the warming has been entrusted to Messrs. Berry & Sons, of Westminster; the carving is by Mr. Aumonier; and Mr. Edward Rogers is clerk of the works.

Our view is taken from a drawing lately in the exhibition of the Royal Academy.

At the time of the competition for the building we published the elevation and the ground-floor plan. The plan has been somewhat modified and improved in execution, and therefore we now give the ground and first-floor plans as executed.

The building was opened on Wednesday last by Lord Cadogan.

Carved Panels, "Bulimba," Sevenoaks.

"BULIMBA," SEVENOAKS.

THIS house stands on well-timbered grounds which slope from Kippington Church southwards, commanding a beautiful view from the terraces.

The external walls are built of Kentish Rag set in cement, with Bath stone dressings.

The *motif* of the design was suggested by the gables of Knole Park. The hall, to be used as a living hall, will be finished all in oak, with dado 6 ft. high, the staircase and arcading will also be in oak with carved panels, &c. The large window lighting the hall will be fitted with stained glass by Messrs. Standring & Co., of Manchester. The ceilings of dining-room and library will be in oak, varied in design. The walls of dining-room will have high panelling with chimney-piece and sideboard designed with it, the panels in the walls being filled with tapestry. The drawing-rooms will have mahogany dado and chimney-piece relieved with bronzed enriched mouldings; the frieze and ceiling, &c., as well as the ceiling and frieze to morning-rooms, will be in rich plaster work; all this being executed by Messrs. Heighway & Co. All the doors are of oak and mahogany fumigated, the furniture and hinges having been specially designed by the architects, and made by Messrs. Smith & Co. The floors of the hall and entertaining rooms will be laid with parquet by Messrs. Illingworth Ingham & Co. All the upper lights of mullioned windows will be filled with stained glass by Messrs. Lavers & Westlake. The principal bath-room will have solid marble bath, with marble dado, &c., the latter made by Messrs. Pattison.

A special feature is made of the loggia entered from the principal bedroom, and from which there is a charming view. The walls and floors are finished in marble mosaic of special design, and executed by Messrs. de Greille, Houdret, & Co., who have also done the rest of the mosaic flooring in the house, verandah, &c.

The general contractor for the building is Mr. D. Baker, of Folkestone. Mr. G. Jennings has carried out the sanitary fittings. Mr. Millson has executed the whole of the stone and wood carving. The warm-air apparatus has been fixed and provided by Mr. Langfield. Mr. E. P. Wright is clerk of works, and Messrs. E. Salomons & A. Steinthal are the architects.

We append illustrations of four carved woodwork panels, which form a portion of the decoration of the interior.

DESIGN FOR DRAWING-ROOM DECORATION.

THIS design, by Mr. Thos. W. Hay, shows the elevation of a drawing-room wall, exhibiting a Renaissance treatment. The angles are splayed to form niches, having bronze figures of Apollo and Minerva. The frieze is a band of gold ornament on a blue ground. Within the architectural framework on the walls are tapestry panels with figure subjects with an ornamental border, the pilasters dividing the compartments having imitation Limoges enamel panels. The chimney-piece is in various marbles, with figures of "Spring" and "Winter"; on the shelf are two gilt bronze candelabra. The dado is in walnut and ivory inlay. The opening on the right shows a conservatory, to have a sliding glass door.

PORCH, ST. EDMUND'S CHURCH, SOUTHWOLD.

THE church at Southwold is a typical late East Anglian church with a tower with buttresses treated in a design in flint and stonework; the south porch presenting a more elaborated example of the same kind of work. The interior shows the usual spacious-looking nave with rather thinly proportioned piers, and a once rich rood-screen which shows plenty of remains of the elaborate painted decoration common in the churches of this part of the country.

In the porch it will be observed that the design of the battlement panels is produced on one face by moulded tracery, and on the other by a repetition of a similar design in flat work.

The illustrations are from a careful set of drawings by Mr. Percy K. Allen.

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A general (statutory) meeting of this Association (hitherto known as the Association of Municipal and Sanitary Engineers and Surveyors) was held at the Institution of Civil Engineers, 25, Great George-street, Westminster, at noon on Wednesday last, Mr. H. P. Boulnois (City Engineer of Liverpool), President, in the chair.

The first business was to receive the report of the Council on the Registration and Incorporation of the Association. This was read by Mr. Thomas Cole, the Secretary. We quote the most salient portions of it:—

"We now bid adieu to the Association of Municipal and Sanitary Engineers and Surveyors, after its successful career of some seventeen years, during which time the work has been carried out in connexion with the sanitary organization of the country which has left its impress upon the various departments of the community, from the country village to the great centres of metropolitan industry. And under the presidency of men of well-known position in the sanitary world, it has progressed from a comparatively small beginning to a position of recognised influence and importance. The time having now arrived in which the fresh developments of Parliamentary action in connexion with the division of municipal work amongst newly-formed bodies, County Councils, and others, has led those who have had the management of the Association to take the necessary steps to bring about the formation of a more comprehensive body than could possibly have been the case under the regulations of the old Association, and in introducing the Incorporated Association of Municipal and County Engineers at its first meeting, the Council desire briefly to put before the members a *résumé* of the steps taken, so as to be an official record of the inception of a step which it is hoped will be of great importance in placing the society on a more solid basis than hitherto has been the case.

Some four years since a good deal of attention was given to the question of applying for a Royal Charter, and a minute in the annual report of the Council in July, 1887, referred to the question of expense, besides other considerable difficulties to be overcome, and it was then pointed out that registration under the Companies' Acts would meet our requirements, and the Council were still considering the advisability of registering under these Acts pending future action in reference to obtaining a Royal Charter. * * *

The Committee appointed at the last annual meeting to take the necessary steps, after many meetings, finally settled upon the necessary Memorandum and Articles of Association. These the Council adopted, and they were duly submitted to the Board of Trade. Amendments were made by the Board, which in their turn were reconsidered by the Committee, and the application was at last advertised in the *Times* of June 14 last. Finally, the Certificate of Incorporation, dated September 22, 1890, was received on the 24th of the same month.

The process of change from the old Association to the new is effected by the signing a formal transfer of rights of membership. This form (Form F) has been sent with a copy of the articles of association to every member for signature. It may be interesting to note that up to the present 321 members have thus subscribed their names as now belonging to the new Association. It is hoped, however, that the full roll of the old Association will, in a short time, be included. It may also be here worthy of note that in sending in their forms, when members have taken the opportunity of commenting, the opinions have always expressed unqualified approval of the step taken by the Council.

The first and most important alteration made in passing into the new body is the change in title. Many suggestions were fully discussed and put aside, finally resulting in a title embodying, first, the municipal engineers, which has always been the *raison d'être* of the Association, and secondly, the "County," as including engineers holding appointments under recent Acts of Parliament as well as including the the present County Surveyers. It was decided to drop the title "Sanitary" and also the

term "Surveyors," it being understood that the title "Engineers" includes "Surveyors." Finally, the prefix "Incorporated" has been inserted by special desire of the Board of Trade. In the consideration of this matter the Council have kept in view the desirability of shortening the somewhat cumbersome old title, and, although much has not been actually achieved in this direction, the result is probably as short as is consistent with the necessities of the case.

With the object of increasing the Association's usefulness to its members, the Council recognise very fully the importance of encouraging candidates who pass the examinations subsequently attaching themselves as Graduates to the Association. It is felt that these gentlemen, in this way, have opportunities of gaining an immense amount of valuable practical information that cannot be acquired by any other means. The number of Graduates who, upon their holding chief appointments, have been transferred to the list of members is a significant fact as pointing to the advantages of the class; and with a view of inducing all those certificated candidates to join, the Council has reduced the annual subscription of Graduates from one guinea to half that sum.

The preparation of the Articles of Association has been done with the assistance and counsel of Mr. Pritchard, solicitor, of Messrs. Sharpe, Pritchard, & Company * * *

In conclusion, the Council trust that the incorporation of the Association will have the desired effect of increasing the public confidence in the examinations, and the value of the certificate granted to successful candidates; that those who hold the certificate will be induced to join as Graduates, deriving thereby an immense amount of useful knowledge and practical experience from their attending meetings and visiting works; and, lastly, it is hoped that the step taken, involving considerable expense and outlay of time and trouble, will be met by members exerting themselves to strengthen the Association by bringing in fresh members and loyally helping, in every possible way, to make the newly incorporated body a continued and an increasing success, and a means of mutual help and of invaluable professional assistance in the important public positions they are called upon to occupy."

On the motion of Mr. Farrell (Sherborne), seconded by Mr. Mann (Sevenoaks), and supported by Mr. J. P. Norrington (Fulham), the report was received and unanimously adopted.

Mr. Lewis Angell, F.R.I.B.A., M.Inst.C.E., Borough Engineer of West Ham, and the first President of the Association, then read a paper entitled "Municipal Work and Sanitary Progress," in which he reviewed the past work of the Association, and referred to the part which it had taken in the advancement of sanitary progress. We have no space to give any portion of the paper this week, but there were a few points in it to which, if space permit, we hope to return next week.

On the motion of the Chairman, seconded by Mr. Charles Jones (Ealing), hon. sec., the thanks of the meeting were tendered to Mr. Lewis Angell for his interesting paper, and the meeting terminated.

LECTURES AT UNIVERSITY COLLEGE.

PROFESSOR REGINALD STUART POOLE began the second term of the Lectures on Archæology, on the afternoon of the 14th, by an introductory address, in which he stated the unusual arrangements which had been made for a successful course of instruction to students. He said that as Babylonian archæology was taught by the monuments and writings of Babylon in the same way as Greek archæology was by the sculptures and paintings of Greece, he had secured the very valuable aid of Mr. W. St. Chad Boscawen, who was competent to teach the former subject with *emphasis*, as compared with many men quite as learned as himself, who seemed as if they could only present colour without its light and shade. Professor Poole said we were more indebted to the Babylonians than to the Greeks for the beginnings of the arts and sciences, and for the earliest attempts to measure out the earth, and this even more so, strangely enough, than to the Egyptians. Much interest had been created by the discovery of stones near St. Paul's with very early Babylonian inscriptions. These had evidently been brought to this country as ballast some centuries ago. He stated that he had also secured the co-operation of Prof. Roger Smith, Professor of Architecture in University College. After thirty-nine years' study of Greek archæology, he (Prof. Poole) was convinced that the best possible method of teaching it was by coins, and these might be compared with sculpture. We had no remains of Early Greek painting except in two colours. Painted frescoes had been found in Rome and elsewhere bearing faint resemblances to the reality, but Early Greek painting is practically lost to us. Four lectures would be given by Mr. Cecil Smith on Greek vases, and the new and more logical arrangement of the treasures of the British Museum would be most helpful in this course; indeed, his (Prof. Poole's) and Mr. Boscawen's work would be equally divided between the lecture-room and the galleries of the Museum.

Mr. Boscawen was then asked to say a few words introductory to his subject. He said that he had prepared an exhaustive bibliography, carefully classified, by which students would be able to see what books were available for their help. He would first deal with the general subject of the locality of Babylonia, and he remarked that one must know the physical features of a country to be able to study its civilisation. This was the source from which they would obtain a knowledge of the manners and customs of a people, as well as of the foreign influences brought to bear on them. He would be able to present many facts that were perfectly new; and in reference to the stones found near St. Paul's said that it was known that there had been some such in this country for two or three centuries. In the gallery rounds, the subject of the religion of Babylonia would require to be taught by translations of texts to be found in the museum; and he remarked that, although we were rich in many departments of Babylonian monuments, yet in the section representing the earliest period the Louvre contained more wealth than our collection. Mr. Boscawen encouraged the students to learn the cuneiform writing, which only required a good memory and perseverance. He impressed upon them the propriety of constantly using the pencil and note-book, and to be always copying.

Professor Poole next spoke of the great success which had attended a class for the teaching of hieroglyphics which he had conducted for some time, and expressed his opinion that as there were many ways of transcribing those characters — one by Maspero, and different methods by others—it was deeply important that students should personally become acquainted with the monuments themselves. They must all bear in mind the undoubted fact that it was quite impossible to dissociate the language of those primitive civilisations (Babylonian and Egyptian) from the knowledge which the language conveys.

On Monday afternoon Mr. W. St. Chad Boscawen delivered, in the section of Archæology, the first of five lectures on the "Principles of Babylonian Archæology," the subject being the component elements of Babylonian civilisation. In commencing his lecture, Mr. Boscawen said that the discoveries of the last few years had tended in a wonderful manner to increase the value of the study of the archæology of the Babylonian empire. The discoveries of Sir Henry Layard, more than forty years ago, had shown the immense influence which Assyrian art had exercised upon Greek art; but Assyrian art in its main features was the outcome of the teaching of Chaldean masters, and the students who sought to draw nearer and nearer to the cradle of art in Western Asia looked with anxious eyes for the discovery of some products of the Chaldean artists. The discoveries of M. de Sarzec had supplied this want, and had shown to us that there existed a native school of Chaldean artists whose work was of the highest character. In the study of the archæology of an ancient people, it was necessary, first of all, to have some knowledge of the geographical and physical features of the country in which they dwelt. Mr. Boscawen then described the principal features of the Lower Tigro-Euphrates Valley, and how they had exercised an influence upon the art of the people. The scarcity of stone necessitated expeditions to distant lands, and the quarries of Sinai supplied the sculptors of the age of Gudea, B.C. 2,500, as they had supplied the kings of the fourth and sixth dynasties in Egypt. In Chaldea as in Egypt we met with the same remarkable phenomenon, that the earlier the art the more true to nature was its character. Mr. Boscawen then instanced the statues of Gudea now in the Louvre, and one remarkable piece of work, a sacrificial bowl sculptured with lions' heads, which, were it not for the inscription upon it, might have been taken for an example of early Greek art. The lecturer then proceeded to show that this work was due to the practical Akkadian artists, to whom neither time nor hardness of material seemed to have been difficulties. Huge masses of diorite, porphyry, basalt, and black granite were sculptured into most artistic forms, and covered with minutely-cut cuneiform characters. He then pointed out how this artistic instinct was to be traced at a much earlier period in the cuneiform signs themselves. He next compared the early hieroglyphic forms of Egypt and Chaldea, and also described the remarkable discovery of the connexion between the writings and languages of China and the Euphrates valley. The mixed ethnic character of Babylonia, and its position as a centre of culture, was shown by numerous languages employing the cuneiform mode of writing, it having spread in various forms all over Western Asia. One of the most remarkable and astonishing features of this spread of Babylonian civilisation was its introduction into Elam, to the east of the Tigris, where it was learnt by the Bak tribes, who in about B.C. 2400, by one of those strange movements so peculiar to Central Asia, proceeded to drift slowly eastward, and in time entered China by the north-west provinces, bringing with them a system of writing and the elements of a civilisation, and with certain legendary lore manifestly of Babylonian origin. This important discovery, first suggested and partially elaborated by Professors Terrien de Lacouperie and Douglas, had now been substantiated in a most detailed manner by the studies of the Rev. C. J. Ball. One result of the discoveries in Babylonia and of the spread of Babylonian civilisation, both eastward and westward, must be to establish for its birth an immense antiquity. The question as to the relative antiquities of Chaldea and Egypt is still unsolved, but the predominance of evidence seemed at present to be in favour of Chaldea. Researches in Egypt had shown that the fauna, especially the domestic cattle of Egypt, were of Europo-Asian origin, and that the Egyptian cultured elements of the time of the fourth and sixth dynasties were also of Asiatic, and not African, origin. Egyptian civilisation had gone up the Nile, and not down the Nile, and it was remarkable to notice in the same manner that the seat of the earliest Chaldean civilisation was in the south, and grew younger as we passed up the dual rivers. There was a commercial touch between Egypt and Babylonia as early as B.C. 3,000; and, although the question of the antiquities of these civilisations was unsettled, the lecturer said that the archæological research of the last years had opened up hitherto dark passages of the labyrinth of time, and taught us the immense importance of the study of these first stages on the pathway of culture.

THE LONDON COUNTY COUNCIL.

THE ordinary weekly meeting of the London County Council was held on Tuesday last, at Spring-gardens, Sir John Lubbock, the Chairman, presiding.

Appeals against Parish Assessments. — The Council, at its previous meeting, adopted the recommendations of the Local Government and Taxation Committee, that the Council should appeal to the Quarter Sessions against the totals of the valuation lists of the following parishes and unions—(*a*) St. George, Hanover-square; (*b*) Holborn Union; (*c*) St. Marylebone; (*d*) St. Giles-in-the-Fields and St. George, Bloomsbury; (*e*) Shoreditch; (*f*) Lambeth; (*g*) St. George-in-the-East; (*h*) Stepney Union; (*i*) Mile-end Old Town; (*j*) City of London Union; (*k*) St. Olave Union; (*l*) St. Saviour's Union. The Council at the same time, however, resolved to adjourn until the present meeting the question whether any of the appeals should be further proceeded with. The Committee recommended:—

"That the Council do appeal to the Quarter Sessions against the totals of the gross and rateable values inserted in the valuation list of the parish of St. George, Hanover-square; that the Solicitor be instructed to give notice of appeal accordingly; that the amounts of increase to be inserted in the notice be 235,097*l.* gross and 193,059*l.* rateable, and that we be authorised to retain counsel and witnesses, as may be necessary, subject to an estimate to be submitted to the Council by the Finance Committee in accordance with the statute, and that in the meantime we be also authorised to make the necessary deposit in lieu of entering into recognisances to prosecute the appeal."

Similar recommendations were contained in the report to the effect that the Council should appeal in the cases of Marylebone, St. Giles's

and St. George's, Bloomsbury, St. Leonards' Shoreditch, Lambeth, St. George's-in-the-East, Stepney Union, and Mile End Old Town. These parishes, the Committee alleged, were under-assessed to the following amounts, viz. :—St. George, Hanover-square, 100,000*l.* gross, 82,000*l.* rateable; St. Giles and St. George, 10,000*l.* gross and 8,200*l.* rateable; Shoreditch, 7,495*l.* rateable; Lambeth, 26,433*l.* rateable; St. George's-in-the-East, 6,300*l.* rateable; Stepney, 3,254*l.* rateable; Mile End Old Town, 215*l.* rateable.

Mr. Boulnois, M.P., moved as an amendment :—

"That no further proceedings be taken in respect of the appeals at the present time, the Council not having sufficient or reliable information before it to justify the heavy expenditure (which would fall upon the rates) in prosecuting and in defending the appeals, and in furnishing professional evidence in the 5,448 cases and upwards suggested by the Committee; especially as in many of the same cases the Assessment Committees of the Metropolis have, in adjudicating, heard the ratepayers themselves as well as the Crown Surveyor of Taxes, and appeals to the Courts of Law have been open in ordinary course to the Crown and others interested; and further that, in taking the extreme course proposed, the Council would not be able equitably to adjust any increased taxation between the ratepayers of the parish affected, but the same would fall upon the ratepayers now assessed to the utmost limit, as well as upon those alleged to be under-rated."

This amendment, which was seconded by Alderman Debenham, was defeated, after a long discussion, by the large majority of 75 votes to 10. The recommendations of the Committee were then agreed to, the Committee undertaking to endeavour to come to some arrangement with the Assessment Committees of the various parishes concerned with a view to diminishing law-costs as far as possible.

The Bethnal-green Slum-Clearance Scheme.—A long and important report relating to this scheme was placed on the agenda by the Housing of the Working Classes Committee, but its consideration had to be postponed for want of time.

Highgate Archway.—The Report of the Highways Committees contained the following paragraph and recommendations :—

"We have again had before us the question of the desirability of widening Archway-road (one of the roads vested in the Council by the Local Government Act), and, as a necessary consequence, the reconstruction of the Highgate Archway under which the road passes. On October 28 last we reported to the Council that, after considering the provisions of the London Street Tramways (Extensions) Act, 1888, with reference to the proposed reconstruction of the archway, we had come to the conclusion that the responsibility with reference to the archway and the road over it devolved upon the Vestry of Islington, which had repeatedly urged the necessity for widening the road and reconstructing the archway, and the Hornsey Local Board; and the Council, on our recommendation, directed that the Vestry of Islington should be informed that the Council could not recognise it as any part of its duty to undertake the reconstruction of the archway, but that should the work be undertaken by the Vestry in conjunction with the Hornsey Local Board, any application for a contribution towards its proportion of the cost of the work would be duly considered. We have since had before us a further letter from the Vestry in which it is urged that as a consequence of the passing of the Local Government Act any responsibilities which formerly devolved upon the Vestry with reference to the road and the archway, were transferred to the Council; and upon further consideration we are inclined to think that there is some force in this contention. We have had an interview with the Clerk of the Vestry, who stated that the Vestry would be willing, should the Council undertake the widening of the road and the reconstruction of the archway in conjunction with the Middlesex County Council, to contribute half of the Council's proportion of the cost of the work, but was not prepared itself to move in the matter, as in its opinion the responsibility rested with the two County Councils concerned. There appears to be little doubt that the road needs to be widened; and having regard to the provisions of the London Street Tramways Act of 1888, above referred to, under which the Tramways Company is to pay 3,000*l.* towards the cost, and to the fact that the Vestry would probably contribute at least half the amount of the Council's share of the cost, we are of opinion that the Council might endeavour to ascertain whether the Middlesex County Council would be inclined to co-operate in the work. We therefore recommend—

'That the Middlesex County Council be asked whether it would be willing to enter into an arrangement with the London County Council for carrying out the work of widening Archway-road and of reconstructing the Archway.'

This was agreed to, and after the transaction of other business, the Council adjourned.

ARCHITECTURAL SOCIETIES.

CARDIFF ARCHITECTS' SOCIETY.—The annual general meeting of the Cardiff Architects' Society was held on the 14th inst., at the Park Hotel, Cardiff. Mr. E. Seward, F.R.I.B.A., presided, and there were present Messrs. Bruton, Halliday, Williams, Caple, Morgan, Vaughan, Snell, Taylor, Thomas, and Baldwin (hon. secretary). The proceedings of the society since its formation last Spring were reviewed, and several matters of professional interest were discussed. The statement of account, showing a good balance, was formally accepted, and the hon. secretary, who is also hon. treasurer, was re-elected for the year just begun. Six nominations of candidates for election were received. It was announced that Mr. Searles-Wood, F.R.I.B.A., of London, would read a paper before the society, dealing with an architectural tour in Italy, on the 30th inst. A paper on "Colour Decoration," by Mr. J. P. Seddon, F.R.I.B.A., will be read later on in the season. It was resolved to hold the society's annual dinner on the 29th inst., at the Park Hotel.

MANCHESTER ARCHITECTURAL ASSOCIATION.—The last ordinary meeting of this Association was held at the Athenæum on Tuesday last, Mr. T. Chadwick in the chair. A paper was read by Mr. R. Elsey Smith on "Some Typical Greek Buildings," illustrated by views with the oxyhydrogen lantern. A vote of thanks, proposed by Mr. Booth, seconded by Mr. Willoughby, and supported by Mr. Mould, concluded the meeting.

EDINBURGH ARCHITECTURAL ASSOCIATION. The usual fortnightly meeting of this Association was held on the 15th inst., the President, Mr. John Kinross, in the chair. Mr. H. Bellyse Baildon read a paper on "The Art Delight—its Rationale." According to the report in the *Scottish Leader*, the paper was based on the assumption that there is a special delight derivable from the contemplation of what is artistically represented, a delight distinct and separate from the contemplation of the same thing in actual existence. While it appeared nothing better than the assertion of a truism to say that the human mind rejoiced in the discovery and acceptance of the truth, it was also an incontrovertible fact that it was continually being involved in the coils and meshes of error, the seeming inconsistency of which facts was at once removed on our reflecting that we necessarily delighted in what we deem to be true, because of its seeming truth, although in reality it may not be true at all or only partially so. To truth, as truth, the mind inevitably inclines, and no error has been or can be accepted except through proclaiming itself as true. Nor did he think this statement invalidated by the fact that a truth may be painful and a delusion pleasing, for the delusion as soon as it is recognised as such loses its prevailing attraction, while the truth when established compels the mind towards it, in spite of its less attractive aspect. Such being the case it must strike all, he thought, with astonishment, that so massive and judicial a mind as Lessing's should have attributed the art delight to delusion—delusion in itself being never other than painful, and in addition to this might be cited the fact that the art which delights us does not delude us, while that which deludes us does not delight us—at least never in the same degree or manner as that which offers no real deception. A picture, a marble statue, or any such fine work of art never hesitates to avow its real nature, never pretends to be that which it represents. No one but a child or an imbecile ever supposes that the picture is anything other than a plain surface, the statue other than cold stone; and the moment the mind doubts either of these facts its pleasure is disturbed if not wholly destroyed. Proceeding to analyse more closely the elements in the art delight, the lecturer said that these fell under three main divisions—the first, the qualitative or intrinsic, which takes its rise in the nature of the thing represented, pleases us in proportion to the beauty of the object itself; second, the dynamic or technical, where the pleasure is derived rather from the excellence of the art and execution than from the nature of the object; and thirdly, the emotional or spiritual, which is dependent on the ideas expressed and suggested by the works of art. It was not, however, to be supposed that those classes of pleasure could often be found separate, or entirely dissociated from each other, and in all the very highest branches of art we should find all three in combination. At the same time, in all the art that fell short of being the very highest, we would find some defect which might be classified by means of these divisions. Mr. Baildon concluded by giving illustrations of his analysis of the Art Delight.

GLASGOW ARCHITECTURAL ASSOCIATION.—The members and friends of this Association, to the number of forty, met for supper in the Grand Hotel, Glasgow, on the 13th inst., the honorary president, Mr. John Jas. Burnet, F.S.A., presiding. The guests of the Association, as representative of various kindred societies or as lecturers for the current session were :—Mr. D. W. Stevenson, R.S.A.; Mr. William Leiper, P.I.A.; Mr. James Thomson, Pres. Archt. Section of the Philosophical Society; Mr. T. L. Watson, F.R.I.B.A.; Mr. Francis H. Newbury, headmaster, School of Art; and Mr. Wm. Paton Buchan, S.E. While assembling, an opportunity was given of examining members' work, as seen in pencil sketches, water-colours, and measured drawings of old work.

ARCHITECTURAL SECTION OF THE PHILOSOPHICAL SOCIETY, GLASGOW.—A meeting of the Architectural Section of the Philosophical Society was held on the 19th inst. in the rooms, Bath-street, Glasgow,—Mr. James Thomson presiding. Mr. Thomas Main read a paper on "Fireplace Construction." He described a fireplace so constructed as to give the maximum of heat with the minimum of fuel. There was no draught in the fireplace, and he claimed that it was smoke-consuming, kept a fresh room, made slow vents active, and stopped down-draughts. He also stated that 2½d., by that fireplace, would heat a room containing 5,000 cubic feet of air for nine hours at a temperature of 60 degrees.

ARCHÆOLOGICAL SOCIETIES.

SHROPSHIRE ARCHÆOLOGICAL SOCIETY.—The annual meeting of this Society was held at Shrewsbury on the 17th inst. Mr. R. L. Kenyon presided. The Secretary, Mr. T. Goyne, read the report of the Council, which stated that the most important work which had been carried out during the year had been the excavation of the crypt of Old St. Chad's Church, which was now completed, and the whole of the interior exposed. It was proposed to make an entrance thereto from the street adjoining as soon as authority could be obtained. A proposal had also been made to the Antiquarian Society to undertake further excavations at the buried Roman city Uriconium near the town. The report was adopted, and the Council and officers were re-elected.

SOCIETY OF ANTIQUARIES OF SCOTLAND.—The second ordinary meeting of this Society for the present session was held on the 12th inst., Sir Herbert Eustace Maxwell, Bart., M.P., vice-president, in the chair. The first paper read was on a series of remains from certain ploughed lands, long buried under the sand dunes of Fendom, near Tain, Ross-shire. A paper by Mr. G. W. Constable gave an account of the excavation of the Harelaw Cairn, on the estate of Glencraig. In the last paper, Dr. Robert Munro, one of the secretaries of the Society, described a series of curiously-constructed objects of wood which have been found from time to time in peat-bogs in various parts of Europe, and are supposed to have been used as otter or beaver traps.

GLASGOW ARCHÆOLOGICAL SOCIETY.—The monthly meeting of the Glasgow Archæological Society was held on the 15th inst., at which Mr. A. M. Scott, F.S.A., read a paper on "The Semples of Cathcart;" and Mr. George Neilson gave a paper on "Peel, its meaning and derivation."

ROYAL SOCIETY OF ANTIQUARIES OF IRELAND.—The annual general meeting of this Society was held in Dublin on the 13th and 14th inst. The President, Lord James Wandesford Butler, was in the chair. Mr. Robert Cochrane, hon. sec., read the report of the Council for the year 1890, which stated that the number of new members elected in the year 1890 amounted to 275, the greatest number ever elected in any one year since the foundation of the Society. Two of the new members were subsequently elected Fellows, fifteen old members were advanced to the rank of Fellow, and seven Fellows were elected, making the total of Fellows elected during the year twenty-four. There are now 138 Fellows and 768 members, making together 906 names upon the roll of the Society. As a result, the financial condition of the Society is satisfactory. After the payment of all expenses of the year, a

balance remains to credit of £258. 2s. 6d. The Council have taken steps to reorganise the system of local secretaries, with a view to having a more efficient system than hitherto prevailed, for protecting and reporting upon objects of antiquarian interest. The Council had under consideration the advisability of preparing an index to the first twenty volumes of the "Journal" (1849-89). They came to the conclusion that a trial should be made by indexing the first five volumes, and that, with the experience thus gained, an estimate of the time and cost of completing the index could be arrived at. The experiment of indexing the first five volumes, so far as the preparation of the MS. index goes, has been undertaken free of all cost to the society. As an extra volume for the year 1890, the Council have decided upon publishing "The Book of Accounts of the Monastery of the Holy Trinity; or, Christ Church, Dublin," edited by Mr. James Mills, from the original document preserved in the Public Record Office. This work is now in the press. The question of the proper housing of the society's museum in Kilkenny, and the best method of rendering it available for exhibition, has occupied the attention of the Council for some time, and is still under consideration. In connexion with the museum the want of a catalogue has been much felt. Mr., J. G. Robertson, the late hon. curator, under whose directions the many interesting objects were brought together, has kindly undertaken to prepare a catalogue. The excavations of Kilelton old church, county Kerry, have proceeded under the direction of the hon. provincial secretary for North Munster, who has furnished an interesting report on the broken crosses, and the oblong and circular chambers found in the tumulus adjoining the primitive sixth-century cell. At Kilmallock the work of securing the beautiful window of the southern transept of the fine Dominican abbey is now being brought to a close under the supervision of the hon. provincial secretary for South Munster.

"It was fortunate the society was permitted to commence operations, as from the extremely dangerous condition into which the whole gable had fallen it could hardly have survived this winter, and this magnificent window, with its beautiful net tracery, would have been destroyed. The White Knight's tomb in the choir will be railed in to keep off cattle. The whole cost of this work is borne by voluntary subscriptions, paid to the society for the purpose, including a contribution voted by the society out of their funds."

The report was unanimously adopted. Papers were read "On the Water Supply of Ancient Dublin," by Mr. H. F. Berry; on "On Ogham Inscriptions found at Kinataloon, co. Cork," by Canon Edmond Barry; and on "House-keeping in Mediæval Dublin," by Mr. James Mills. The second day was spent by the members in the New Science and Art Museum.

OBITUARY.

MR. W. E. BARTLETT.—On the 16th inst., at Stoke, the death occurred of Mr. W. E. Bartlett, who occupied the post of Borough Surveyor to the Devonport Corporation from 1843 until about seven or eight years ago, when failing health caused him to retire. Unable to grant him a pension, the Council (according to the *Western Morning News*) marked their appreciation of his services by making him their consulting engineer, and this office he held up to the time of his death. As the son of a Devonport builder, Mr. Bartlett's practical experience was most valuable to him, and under his direction schemes for the drainage of the town were carried through. He took much interest in sanitary improvements, and his activity and hard work during the cholera epidemic were recognised by a vote of thanks from the Corporation, accompanied by an honorarium.

MR. ANTHONY PAYTON, C.E.—The death is announced of Mr. Anthony Payton, C.E., who for many years filled the position of inspector of the permanent way for the Chesterfield district on the Midland Railway.

A MOSAIC PAVEMENT FROM BROKEN CROCKERY.—We have had an opportunity of seeing, at the offices of Messrs. Jeremiah Lyon & Co., Lombard-court, what claims to be a new kind of mosaic pavement. The material of the tesseræ consists simply of broken crockery, potsherds, or pottery waste, divided into small pieces and set in Portland cement. Although each of the tesseræ has a glazed surface, the pavement affords a very good foothold, for no attempt is made to rub it down to an absolutely level surface as in marble mosaic pavements. It is stated that any required colour can be obtained. This method of utilising what is now practically a waste material seems to be capable of good results artistically, and appears to be worth attention.

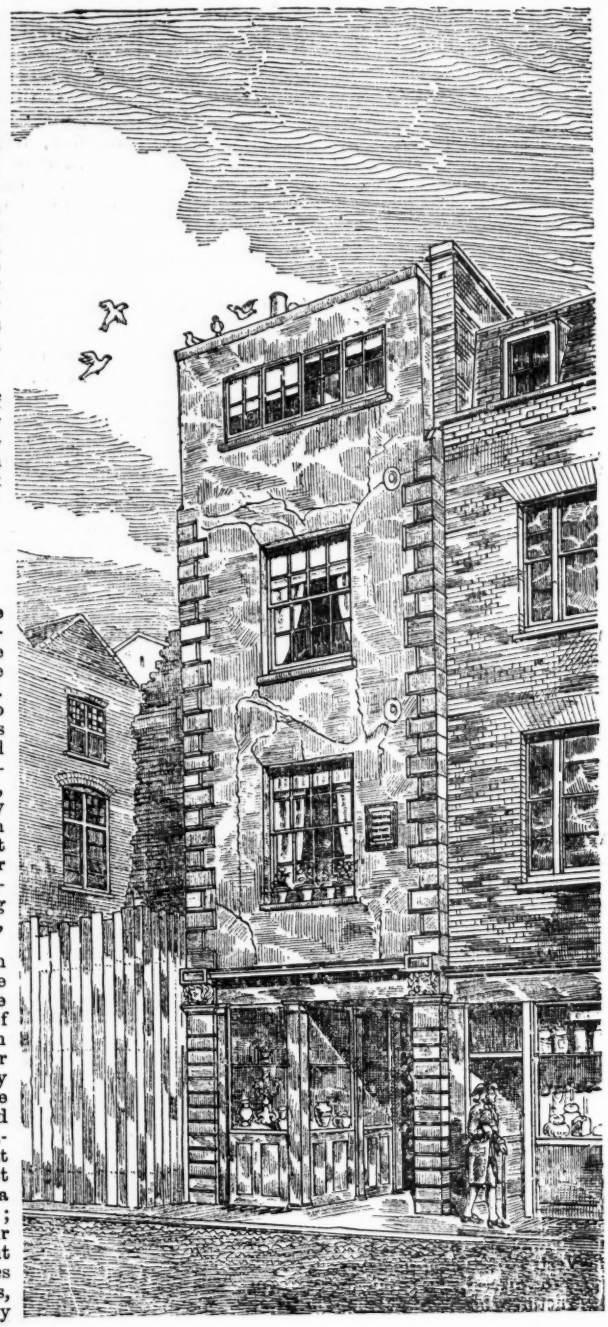
Correspondence.

To the Editor of THE BUILDER.

DRYDEN'S HOUSE.

SIR,—After Homer's death an endless number of towns claimed the honour of his birthplace, although when living they cared very little for his company. Dryden was not very much better used; but as there is competition among the public and an eagerness to define his residence in Fetter-lane, I beg to put in my claim, as on the house, No. 17A (now demolished), was a tablet with this inscription: "Here lived John Dryden, the poet, B. 1631, D. 1700. Glorious John."

The house belonged to a client of mine, who disposed of it to the City Sewers Commission; and before demolition I took a sketch of it, which I forward for publication, if you think well. T. E. KNIGHTLEY.



House in Fetter-lane, now demolished: formerly claimed as Dryden's.

ST. SEPULCHRE'S CHURCH, LONDON.

SIR,—In your notice of the above church in the *Builder* of December 27, I was glad to read that the churchwardens are about to restore the tombstone of Captain John Smith. The old dark blue slab, thought to be his memorial, having three Turks or negroes' heads upon it, I had taken great care of during the carrying out of the works in the church, as described on the first page of my paper on the restoration of church in 1880; and I may mention that both Dean Stanley and Canon Farrar were much interested about its preservation, writing to me and visiting the church twice upon finding it, and inspecting it where it was laid.

Much has been said and written about the several repairs to the church, and more especially the one immediately after the Great Fire of 1666, and that the church was then almost entirely rebuilt by Sir Christopher Wren. I was kindly allowed by the churchwardens some fifteen years ago to examine the old Minute Books of the Vestry, commencing at the time of the Great Fire, in 1666, when I made (amongst other very interesting matters) a transcript of their resolutions; stating the several works of repair to the church that were carried out by their orders,—giving the names of each master of the several trades, and amounts paid by them. To my mind it appears distinctly under the direction of the vicar and churchwardens only, being commenced in 1667 and completed in 1670, and not under the direction of Sir Christopher Wren. I have thought it well to send my pamphlet describing the several alterations and restorations, giving you the details of the various works, showing there was no rebuilding by Wren; indeed, the whole of the old walls remain, with the window-jambs and arches almost perfect, as in 1450; only the mouldings and stones calcined in places by the fire in 1666, which have been since reinstated. You will, I think, upon perusal of the same, consider the documentary statements contained in the ancient minute-books as the best historical evidence to be obtained upon the subject.

I would not have troubled you with these few lines did I not feel that the statement that Sir Christopher Wren restored the church, having been repeated in various papers, cannot really be substantiated as correct history, and therefore should not be allowed to go unchallenged.

ARTHUR BILLING, F.R.I.B.A.

VENTILATORS TO SOIL-PIPES.

SIR,—In the tenth paragraph of Mr. Buchan's letter which appeared in your last issue he says, "Now, I do not at present believe that they had any such idea or object until after the letter from me which appeared on page 372 of the *Builder* for Nov. 8 last."

This unwarranted remark he applies to a statement in my letter published in your issue of the 10th inst., which was, "that the object which I and Mr. Simmance always had in view is to ventilate soil-pipes by means of a continuous current of fresh air always moving in the same direction, in a manner to prevent sewer-gas from getting into the soil-pipe."

I think that, taking into consideration the fact that neither myself nor Mr. Simmance are personally known to Mr. Buchan, the recklessness with which he impugns our veracity is an index of his utter disregard for anyone but himself.

It is impossible for him to conceive that any common-sense idea could by any means occur to anybody except to Mr. W. P. Buchan, and therefore he unhesitatingly stamps our statements as unworthy of belief.

Now, with regard to the drawing which appears on page 34 of the *Builder*, illustrating our idea of the ventilation of soil-pipes by a current of air moving always in the same direction, Mr. Buchan says "it so happens that this is the system illustrated by fig. 22 in my patent of 1883," and of which fig. 6 in his letter is a skeleton sketch "showing the air and water both going in the same direction."

A careful examination of these drawings will demonstrate the fact that these differ materially from each other. In his drawing there is an open grating above the sewer trap, not perceptible on a cursory examination, on account of the smallness of the scale, which will make the practical working of his plan very different to that shown by the arrows. Therefore, whilst my drawing shows a simple and practicable application of an idea which does work well in any weather, Mr. Buchan's small skeleton sketch shows an undecided system not at all like ours, and which will not work well. He says he has sometimes carried this out in practice. Has he not in so doing jeopardised the health of his clients?

In the matter of the two drawings his statements are, therefore, misleading. Why did he not put in an enlarged drawing, so that the details might have been distinctly seen without the aid of a magnifying glass?

After this sample of Mr. Buchan's method of argument, it is hardly worth while to refer to his ill-natured remark, "that my drawing was designed by a person having a very superficial knowledge of

plumbers' work," excepting that on page 222 of his book on plumbing, referred to in his letter, *he shows branch air-pipes precisely similar to those in my drawing*, and does not condemn them.

In the system illustrated in my drawing, the air pipes may be separate or connected together in one pipe, according to the circumstances which rule the case.

Notwithstanding that we have never recommended the use of our ventilator on the *top* of a soil pipe, Mr. Buchan still persists, for the purposes of carrying on an unfair argument, in saying that we do. I protest against this further attempt to mislead your readers.

After having endeavoured to understand the fifteen claims and seventy-three somewhat vague sketches in Mr. Buchan's patent of 1878—wondering all the time how he ever induced the Patent Office to grant him so many different patents and outlines of patents for one fee—I have found fig. 4, which is not like my cowl, but cannot find fig. 5 as shown in his letter. This fig. 5 is nearest in outline to my patent cowl; but there the resemblance ends, excepting when it has a hinged valve, which Mr. Buchan knows, having our patents before him, I do not claim, because it is notoriously public property. The hinged valve was used by Arnott and others long before the date of Mr. Buchan's patent, and, therefore, should be omitted from his list of public benefactions.

Nevertheless, when I use a hinged-valve, the hinge of my valve differs from Arnott's and all others in being made of steatite, a very smooth, hard, mineral substance, which when finished is harder than the hardest steel, and perfectly incorrodible, and, therefore, not liable to get out of order.

In conclusion, I beg to say that the experiments on which I found my statements of the utility of our inventions are not made in a room with the aid of a bit of candle, but in the open air, in all kinds of weather, and under practical working conditions.

I am at all times ready to show any of your readers who are interested in ventilation the practical working of our cowls, and to permit them to make trials of them. WILLIAM SUGG.

SIR,—In my letter on p. 51, thirteenth line from top, there is a small mistake, viz.,—"figs. 1 and 2 below" should read "figs. 2 and 3 below." The references are all right immediately after, but it may be better to rectify this. W. P. BUCHAN.

*** The mistake was not ours.—ED.

The Student's Column.

VENTILATION AND WARMING.—IV.

AVOIDANCE OF DRAUGHT.

AS it is hardly possible to obtain the ideal current of air mentioned in our last chapter, we should endeavour, in order to avoid draught, to reach as close an approximation thereto as possible, and we should, therefore, as our first precaution, break up our current of air to the fullest possible extent by sub-dividing our openings, both inlets and outlets, to the highest practicable degree. The inlets, especially, we should reduce to an individual area of at least one foot superficial, while half this area would, usually, be far better.

We have taken it for granted, that in our ventilation, we have both inlets and outlets, for, at this time of day, we need hardly suppose that any student would imagine that either can be dispensed with, or that if openings are provided for the exit of the foul air, the fresh air will find its way in somehow. With a sufficiently strong aspirating cause drawing out the foul air, it is undoubtedly true that there will be an influx of air from somewhere coming in somehow, whether through imperfectly fitting doors and windows, or through the more or less porous walls, ceilings, and floors. But these channels then form the inlets that we require, and it is in the highest degree probable, that these self-constituted inlets will give evidence of their existence by the manifestation of draught.

Nor is it desirable to rely upon one opening, or one series of openings, acting as both inlet and outlet. Such an action is particularly favourable to the development of draught, and there is also the high probability, amounting almost to certainty, that the incoming fresh air will mingle with and bring back with it some of the foul air we are anxious to get rid of.

Both inlets and outlets, then, we must have, and it is desirable, in order that our ventilation should be thorough, that these be so placed that the current of air shall traverse the whole of the apartment. Only in this way can we hope to sweep out not only the gaseous impurities but also those that are, as we have seen, far more difficult to deal with,—the organic impurities and added water vapour.

In dealing with natural ventilation, there is especially a dangerous probability of draught, for as the current of air depends, as we have seen, upon difference of air pressure, produced usually either by difference of temperature or by wind; and as these phenomena of nature are not capable of regulation by us, it will frequently happen that the intended direction of the current will be reversed—the outlets will act as inlets and *vice versâ*. Hence it is important to avoid the probability of this as far as possible, and also to make such provision that when the reversal of current does occur the evil effects may be minimised.

Accordingly, the position of both inlets and outlets should be so arranged that there may not be a certainty of some of either class of openings operating more strongly than their fellows. If, for example, the inlets are arranged some on one side of a room, some on the opposite, so that one set is exposed at times to considerable wind pressure, while the other is warmed by the sun, it will be almost certain that, the outlets being assumed to be actuated by natural causes only, the former set of inlets will act as inlets, but the latter as outlets. This will probably upset the action of some at least of the intended outlets, and there will be through them a certain amount of down draught.

It must, therefore, be remembered that all the inlets should be, as far as possible, exposed to similar air-pressure and temperature; and so also, even in a greater degree, with the outlets.

Again, to preserve equality of action in the outlets, it is important that any flues or air-ducts for the removal of the vitiated air should, in natural ventilation, be of the same height, or the longer ones will have a tendency to a quicker current than the shorter, and may consequently overpower them.

The area of the outlets should never be greater than that of the inlets; it is preferable, rather, that the converse condition should exist, though it is inadvisable that there should be much excess of inlet, as this generally contributes to irregularity of current.

Outlets should especially be protected from reduction of temperature; rain and snow should be unable to penetrate to their internal surface, and the wind should not be allowed to blow down any outlet tube, hence the open-mouthed tube, although effectual when the wind is in a favourable direction, requires protection from downward current.

The outlets should also be as straight as possible, and with smooth surfaces to any tubes or ducts so as to maintain as effective an action as possible, for we are still considering the avoidance of draught with natural ventilation, in which, it must ever be remembered, that the currents are usually feeble, and frequently extremely so.

Having taken every possible precaution to prevent reversal of current we must still, in any application of natural ventilation, expect that, in spite of all our precautions, a greater or less reversal of current will occasionally occur. No cowl or other apparatus depending for its motive-power wholly on the wind can be trusted to be universally free from down draught. "Self-acting" ventilators are liable to down draught in two opposite conditions of wind-pressure, in calm and in storm. At a low wind-pressure, and with the resulting feeble current, the aspirating power of the "self-acting" ventilator is liable to be overpowered by a superior strength of current. On the other hand, with a strong gusty wind, the current is at times particularly powerful and the internal atmosphere rarefied thereby, then may follow a sudden drop of the wind and the outlet relieved from the aspiration becomes an inlet.

To meet the danger of down draught, manufacturers are now introducing valves in connexion with "self-acting" upcast ventilators, of which those made by Sugg & Co. are a good example. Of necessity, these valves must be extremely sensitive in action, and are therefore especially prone to the possibility that affects all valves,—the liability to get out of order. We must therefore make such provision that when a reversal of current does occur, the result may be as innocuous as possible; hence it is advisable to break up the current of the down draught, and to deflect its course, so that it may not impinge directly upon the occupants of the room.

Inasmuch as with natural ventilation a varying strength of current is inevitable, the openings should be of sufficient extent to avoid a too rapid current, that is one of greater velocity than 2 ft. per second, when the motive-power is at its highest efficiency. Thus, when the activity of the wind or other motive agent decreases, our current will be still further removed from a dangerous velocity, and we shall always be on the safe side.

It is advisable to protect the inlets, as a rule, from the direct action of the wind, as if freely exposed, it is practically certain that at times the current will be unbearably rapid.

By reason of the varying rate of current it is somewhat difficult to satisfactorily arrange means of heating the incoming air. If, however, this is attempted the provision must, in order to be effectual, be sufficient to warm the air of the most rapid current. As it will then possibly be too much for a feeble current, it will follow that, to be satisfactory, the heating power should admit of ready reduction. When adequate provision for warming the incoming air has, however, been made, there still remains the necessity for careful and constant supervision and attendance.

This, however, we cannot always depend upon, and it is therefore advisable to arrange the inlets so that if the incoming air is not of the right temperature, or is too rapid in current, the stream should not impinge upon the persons of those in the room.

Inlets for natural ventilation should, therefore, be at least 5 ft. above the floor level, and with an upward direction. The air stream should be subdivided as much as possible, hence wire gauze or perforated metal are useful. In using these, however, care must be taken that the clear opening is in excess of the area of the duct leading to them. Indeed, generally, it is well that inlets should expand towards their delivering orifice, as this assists the diffusion of the fresh air and tends to prevent draught.

The ventilation openings should, as a matter of expediency, be capable of being closed at will by easily-worked valves, so that when the evils of natural ventilation become unbearable they may be obviated by an abandonment of the ventilation. Indeed, as a rule, so perverse is human nature, that people will readily endure a draught which they could easily shut out, when, if it were beyond control, the whole ventilation scheme would be condemned and extinguished.

Accordingly, if we employ natural ventilation, we should, after taking every possible precaution to avoid draught, provide for the temporary suspension of ventilation when our precautions fail, or appear to do so.

GENERAL BUILDING NEWS.

ST. STEPHEN'S CHURCH SCHOOLS, CANONBURY, N.—The new schools attached to St. Stephen's Church were opened by the Bishop of Bedford (Dr. Billing) on the 2nd inst. The new rooms consist, on the ground floor, of a boys' school, 30 ft. by 26 ft., and a class-room, 21 ft. by 16 ft., and a girls' school and class-room on the first floor to correspond. The rooms on the first floor are arranged to be used in connexion with the present school as one room, so as to be available for concerts and other parochial entertainments. The opening between new and old schools on the ground floor is provided with revolving shutters, supplied by Messrs. Francis & Co., so as to form two rooms when required. The upper rooms have open-framed roofs. The walls of the main schools are plastered above the dado level, and those of the class-rooms are faced with stock bricks. Boarded dados, 3 ft. 6in. high, are provided to all rooms, and the woodwork throughout is stained and varnished. Brown salt glazed bricks have been used for fireplace openings, and Shorland's Manchester grates. Messrs. McCormick & Sons, of Canonbury-road, were the builders; and Mr. Arthur Ardron, of Southampton-street, Bloomsbury, is the architect. The site upon which the schools are built was a gift from the Marquis of Northampton.

CHAPEL BUILDING, THROCKLEY.—On the 17th inst. the foundation-stones of a new Primitive Methodist Chapel were laid at Throckley, Northumberland. The site of the new building is at the east end of the village, and Mr. Jos. Shields, architect, of Sunderland, has prepared plans for a building to seat 150 persons, at a cost of about 300*l*.

NEW PUBLIC HALL FOR LIVERPOOL.—A former proposal for providing a Public Hall at Liverpool having fallen through, a new scheme has just been adopted, and Messrs. Ware & Rathbone, architects, Liverpool, are engaged in preparing plans. The site of the new building is in Myrtle-street. The ground floor of the new hall will be used as a large club, or rather clubs, and a portion will be devoted to women, and another to men. It is also proposed to include a drawing-room in this part of the scheme.

Over the ground floor there will be two principal concert-rooms—one, which is to be provided with a large organ and properly arranged orchestral platform, and will accommodate 2,000 auditors, while the other will be calculated to seat 400. A number of committee-rooms are included in the plans.

ARTISANS' DWELLINGS, DUBLIN.—The old and dilapidated buildings at Crampton Quay, Dublin, having been removed, artisans' dwellings, the building of which is now almost completed, are being erected on the site. The new structure forms the three sides of a rectangle which face Crampton Quay, Bedford-row, and Temple Bar. The buildings will be divided into two main divisions. The basement will be composed entirely of shops, having no connexion whatever with the two stories overhead, which are to be parcelled out into sixty-eight artisans' dwellings. The roofing of the shops is to be composed of concrete supported by iron work. The frontage of the new structure is of the following dimensions:—Crampton Quay, 140 ft.; Bedford-row, 120 ft.; and Temple Bar, 135 ft. All the shops will, in addition to the front entrances, have entrances from the rear. The entrance to the dwellings will be from the interior of the rectangle, by means of stairs reaching to two balconies, which will extend right round the building. Each dwelling will be complete in itself and entirely separated from every other. The work is being carried out by Messrs. J. & W. Beckett, South Dock Works, Dublin, under the superintendence of Mr. Ashworth, architect to the Artisans' Dwellings Company.

VICTORIA HALL, QUEENSBURY.—On the 17th inst., the Victoria Hall, Queensbury, built and presented to the inhabitants of Queensbury, Yorkshire, by Messrs. Foster & Sons, was formally opened by Mr. A. B. Foster. The hall is situated at Sandbeds, and the main front faces the Halifax road. The chief entrance is on the south front, and gives access to the public hall, reading-room, and library on the ground floor, and to smoking and recreation rooms and science lecture-room on the first floor. A shallow portico with coupled columns admits to the vestibule, which contains in side niches the marble busts of Mr. John Foster, the founder of the firm, and of Mr. William Foster. The busts have been carved by Mr. J. Nelson MacLean. The vestibule is of irregular shape, and is lighted chiefly by a large window on the stair landing, filled with stained glass by Messrs. Powell, of Leeds. The stair is of stone, and the floor of the hall, &c., is of mosaic. The main hall has a total length of 80 ft., with a width of 39 ft., and will provide about 600 sittings. There is a semi-circular orchestra and raised platforms at one end. Dressing and retiring rooms are attached. At the opposite end of the hall is a gallery. The roof of the hall is open to the collar, the ceiling being boarded and panelled; the woodwork is of pitch pine, dressed and unstained. The hall is lighted by gas pendants and wrought-iron brackets, the ventilation being effected by open panels in the ceiling. The reading-room is lighted by a large mullioned bay window, opening into the room by a semi-circular arch. The library is fitted up in pitch pine. The science lecture-room is situated above the reading-room, and has a panelled ceiling, and is lighted by a arched-headed mullion window. In a wing at the side of the main hall is the swimming-bath, lighted from the roof and by a large gable window. The bath is constructed of white glazed brick, and one side and end of the room are occupied by open dressing-boxes. In the basement in connexion with the baths are the washing and drying rooms. In a lower chamber are placed the Berryman heaters and circulating pumps for the baths. These are worked by exhaust steam conveyed from the Black Dike Mills, the heating of the whole building being effected by their means. Beneath the main hall is a dining-room, and in connexion with it a kitchen. The style of the building is "Queen Anne." The exterior is of local stone, the front being of fine-dressed wallstones, with ashlar dressings. A tower rises above the main entrance and is surmounted by a stone lantern. The carving has been executed by Mr. R. Boys, of Bradford. The work has been executed by Messrs. Foster's workmen, under the superintendence of the firm's clerk of works, Mr. Jonathan Jowett. The architects are Messrs. T. H. and F. Healey, of Bradford.

CHAPEL RESTORATION, CIRENCESTER.—The old Presbyterian, now the Unitarian Free Christian, Church, in Dollar-street, Cirencester, has just been re-opened, after restoration. The architectural characteristics of the building are of the late Tudor style. The old galleries have been practically removed, and the irregular tub seats, with the old paving, have been taken away and replaced by oak wood block in aisles and boarded joists beneath sittings, supplied by Mr. R. L. Lowe, of Farnworth. The floor has a ventilated space beneath, and 6 in. of concrete lies under the whole building. The building has a new roof, the internal soffit of which is panelled. The walls have been plastered with cement. The new roof is carried by four pairs of principals, and the side walls have been raised 2 ft. to receive it. A new top window has been added on the north side, and one of the south windows, which was formerly obscured by the gallery, has been restored. A window in the east wall has had to be built up. The seating is by means of red deal benches. The hot-water heating apparatus has been supplied by Messrs. Cock & Bartholomew, of Cirencester. The outbuildings have been restored, and a new drainage system has been introduced. The works have been carried out by Mr. William Newcombe, of Cirencester, from the designs and under the superintendence of Mr. T. Locke Worthington. The cost of the restoration will be about 800*l.*

PROPOSED NEW POLICE BUILDINGS AT SOUTH SHIELDS.—On the 14th inst., Col. C. H. Luard, R.E., a Local Government Board Inspector, attended at the Town Hall, South Shields, and held an inquiry in reference to the application of the Corporation for consent to borrow 17,000*l.* for the purchase of land and the erection thereon of police buildings and a fire brigade station. The Commissioner, accompanied by members and officials of the Corporation, having made an inspection of the site of the proposed buildings, said, in his opinion, the Ogle-terrace site was one of the very best sites he had ever seen. The Town Clerk having thanked the Commissioner for the manner in which he had conducted the inquiry, the proceedings concluded.

CATHEDRAL APPROACH IMPROVEMENT, GLOUCESTER.—The first general meeting of the shareholders in the Gloucester Cathedral Approaches Company, Limited, was held on the 17th inst., Mr. A. Knowles presiding. In moving the adoption of the Directors' report, the Chairman said the way was now clear for going on with the College-street improvement. A tender had been accepted for clearing the ground, and when that was completed they would be better able to say what class of buildings they would erect. There was still a large sum required to complete the whole of the buildings. It was estimated they required 9,000*l.* The report was adopted.

NEW BANK AT BLACKPOOL.—The contract for the new bank at Blackpool for the Preston Banking Company has been let to Mr. T. H. Smith, builder and contractor, of Blackpool, his estimate being 4,800*l.* The architects for the work are Messrs. Maxwell & Tuke, of Manchester.

HOTEL, ST. ANNE'S-ON-THE-SEA.—The contract for alterations to dining-room and lavatories of the St. Anne's Hotel, St. Anne's-on-the-Sea, has been let to Messrs. Walmersley & Smith, builders and contractors, of St. Anne's-on-the-Sea, their estimate being 80*l.* The architects for the work are Messrs. Maxwell & Tuke, of Manchester.

NEW BATHS, BATLEY.—We are informed that Mr. Walter Hanstock, A.R.I.B.A., has received instructions from the Batley Corporation to prepare plans for public baths, consisting of two swimming-baths, thirty slipper-baths, Turkish and vapour baths, &c., and a house for the manager.

SANITARY AND ENGINEERING NEWS.

HOUGHTON-LE-SPRING SEWAGE DISPOSAL—DURHAM.—The Houghton-le-Spring Local Board of Health, having agreed to adopt a scheme of sewage disposal, consulted Mr. D. Balfour, M.Inst.C.E., of Newcastle-on-Tyne. He prepared plans accordingly, showing the process of purification to consist in first mixing the sewage in large tanks (in duplicate) with alumino-ferric, a cheap chemical, which is stated to contain 46·7 per cent. of sulphate of alumina, and which is suspended in iron baskets or cages immersed in the sewage, to admit of the necessary proportion being dissolved to effect precipitation, and which, it is asserted, does not, like a large number of chemicals, require any machinery, nor add any bulk to the sludge, being entirely soluble in water, nor is it liable, being a neutral salt, to re-fermentation. The clarified sewage is then passed on to ten acres of land laid out for intermittent land filtration, the plan adopted consisting in forming the land into half-acre beds, broad-ridged, and furrowed, and which are used in regular rotation. These beds have special under-drainage, with ventilation shafts, into which the effluent will pass, so it is asserted, in a colourless, tasteless, and inodorous state. As sufficient suitable land could not be obtained, this chemical precipitation process was conjoined with the limited land for the purpose of chemically precipitating the solid matter as much as possible before applying the sewage to the land. Various succulent crops are grown on the ridges, the sewage filling the furrows. The scheme has just been approved by the Local Government Board.

SEWERAGE AND WATER SUPPLY, STROUD.—The Stroud Board of Health decided on the 7th inst. to apply immediately for power to borrow 3,000*l.* to improve the water-supply of the town, and 5,000*l.* to extend the drainage system and improve the present lengths of sewerage.

SEWERAGE OF ASH-NEAR-SANDWICH, KENT.—The sewerage of this village has long been in an unsatisfactory condition, and several proposals have been made as to the best method of dealing with it, none of which have found favour, and the last application to the Local Government Board for a loan to carry out the works proposed was refused. A fresh application having been made for a loan of 4,000*l.* for carrying out the works, Mr. Arnold Taylor, one of the inspectors of the Local Government Board, held an inquiry at Ash-near-Sandwich, on the 20th of November last, when a complete scheme for the sewerage of the place was submitted by Mr. Charles H. Beloe, C.E., comprising a system of sewers, conveying all the sewage o the place to one spot, where it is proposed to treat it in accordance with the system of the International Water and Sewage Purification Company, Limited. The sewage is first led into tanks, and there treated with the precipitant and deodorant supplied by the company, called ferozone, and then filtered through polarite filter-beds. The inquiry was attended by a large number of people. On January 7, Mr. Frederick S. Cloke, the Clerk to the Sanitary Authority, received the sanction of the Local Government Board to the proposed loan, and it is hoped that the works will be proceeded with without any further delay.

THE SANITARY INSTITUTE.—In connexion with this Institute, the eleventh course of lectures and demonstrations for sanitary officers is announced. The lectures and demonstrations have been arranged for the special instruction of those desirous of obtaining knowledge of the duties of sanitary officers. The various subjects will be dealt with in a course of sixteen lectures, given by well-known authorities, and will be illustrated with diagrams, drawings, and models. These lectures are a continuation of the courses previously held by the Parkes Museum, and it is proposed to repeat the course twice each year, to suit the requirements of persons preparing for the examinations of the institute. The lectures will comprise the subjects scheduled for these examinations. The course will also, it is hoped, be useful in supplying the wants of acting inspectors and of other persons desirous of obtaining a practical knowledge of sanitary requirements and regulations. At the close of each lecture, students will be allowed to ask questions upon the subjects treated. The lectures will be given on Tuesdays and Fridays at 8 p.m., in the Parkes Museum, 74a, Margaret-street, W., and students attending the course will be granted free admission to the museum and library during February and March. A fee of 1*l.* 1s. will be charged for the course, to cover the necessary expenses, but inspectors or surveyors holding office, and candidates for the examinations of the institute, will be admitted at half fees. Further particulars may be had of the Secretary of the Institute, 74a, Margaret-street, W.

PROPOSED NEW SEWERAGE WORKS FOR EASTBOURNE.—On the 8th inst., at the Eastbourne Town Hall, Mr. J. Thornhill Harrison, Local Government Inspector, held an inquiry into the application of the Council to spend 25,000*l.* on a system of surface water disposal. The scheme has been devised by Mr. G. A. Wallis, M.I.C.E., and Mr. H. M. Whitley, C.E., with the assistance of the Borough Surveyor (Mr. Charles Tomes). In 1865 a sewer outfall was carried from Eastbourne to Langney Point, a distance of three miles, at the cost of the Duke of Devonshire. The Shone Ejector system was adopted in 1880, and has been since in operation. During the past twenty-five years the death-rate has averaged only 13 per 1,000. To prevent the flooding of the low-lying parts of the town, it is now proposed to construct thirty-eight large tanks. Into these the storm water will flow, and it will be utilised for flushing the sewers. The Town Clerk (Mr. H. W. Fovargue) stated at the inquiry that the ejectors had worked exceedingly satisfactorily for the past nine or ten years, and the Council intended to provide further ejector power. Evidence was given by Mr. Wallis, who stated that the population of Eastbourne was now estimated at 36,000. He also mentioned that he had successfully used the tank-system for storing surface water for flushing purposes at Hailsham. Mr. H. M. Whitley and Mr. Shone (Shone & Ault) also gave evidence. The Inspector will report to the Local Government Board in due course.

WIRKSWORTH WATERWORKS.—Mr. W. H. Radford, C.E., has prepared a scheme for obtaining an increased supply of water at Wirksworth. The town is now supplied by gravitation from springs issuing from out of the Millstone Grit. There is a large surplus during the winter, but the springs run very low, and there is consequently a scarcity for about three months in the summer. As there is no additional supply available within a reasonable distance, it is proposed to construct an open stone-built reservoir to hold three million gallons, in order that the winter's surplus may be stored for summer's use. A special meeting of the Local Board has been called to consider the scheme.

ELECTRIC LIGHTING OF WYNYARD.—One of the largest private house electric light installations in England will be that at Wynyard, Lord Londonderry's country seat in Durham. This installation, the contract for which has recently been given to Messrs. Drake & Gorham, will comprise 753 incandescent lamps, together with a steam-power electric generating plant of the necessary large dimensions. Mr. A. A. Campbell Swinton has been appointed consulting engineer to superintend the work on Lord Londonderry's behalf.

THE EXCEL GRINDING MILL.—Messrs. Leachman & Co. send us a diagram and description of this mill (Breakell's patent), for crushing ores, Portland cement, emery, &c. The crushers are of cast steel, and operate on the inner superfices of a steel cylinder, being driven by a cam-wheel working on a central axle within them. The mill is compact and entirely self-contained; total weight 22 cwts.

FOREIGN AND COLONIAL.

FRANCE.—By an order of the Minister of Public Instruction and Fine Arts, M. Antonin Mercié has been commissioned to execute the monument which is to be erected in the Panthéon to the memory of the generals of the French Revolution. M. Chapu, in the same monument, will execute the portion referring to the orators and statesmen of the same period.——M. Puvis de Chavannes has been commissioned by the Government to execute the cartoons for two tapestries to represent the youth of Joan of Arc at Domrémy.——The Municipal Council of Paris has voted 50,000 francs for the representation of the city administration at the Moscow Exhibition.——M. Jules Lefebvre has been elected an associate member of the Academy of Antwerp, in place of the late M. Robert-Fleury. ——M. Cordonnier has just executed a restoration of the statue known as the "Victory of Samothrace:" it has been cast in bronze by MM. Bapst and Falize.——The third exhibition of the "Union des Femmes Peintres et Sculpteurs" will be opened on February 21. The "Société des Artistes Indépendants" will open their seventh annual exhibition at the Ville de Paris Pavilion in March or April. ——M. Laisne, architect, and member of the "Commission des Monuments Historiques," has died, at the age of 72.——The town of Toulon (Var) has demanded from the Government the demolition of its fortifications in order to allow of the further extension of the town. M. de Freycinet, the Minister of War, has informed the municipality that it is impossible to grant their request.——The celebrated Palais de Justice at Rouen, which is one of the principal archæological curiosities of that city, has been seriously injured by a fire which was not extinguished without great difficulty. The wing of the palace in which the fire broke out was rebuilt in 1882, under the direction of the architect Lefort. Fortunately the fire did not touch the Salle des pas Perdus, the decoration of which dates from 1508.——The Abbé Guichard, curé of Pupillin (Jura), has discovered in the course of some excavations in that neighbourhood a fine bronze antique statue of Jupiter.——At Pau there is in preparation what will prove a very interesting retrospective exhibition, which is to include objects of art belonging to the Basses Pyrénées, as also of Landes, Gers, and the Hautes Pyrénées."——There is some question of removing Caillé's statue of Voltaire which stands on the Quai Malaquais, and which is too high in relation to the Palace of the Institut close by. It is proposed to replace it by one of d'Alembert, which would be put up to competition. If this proposal is adopted the statue of Voltaire will be re-erected to the left of the Panthéon, as a pendant to Berthet's statue of Rousseau.

BERLIN.—The municipal authorities of the city have voted 100,000 marks towards the International Art Exhibition to be opened in May. The work of adapting the exhibition halls in the "Landes Ausstellungspark" for hanging purposes has been commenced.——In honour of Professor Karl Becker's seventieth birthday an exhibition of this artist's paintings has been opened.——The Schliemann collections, which are at present to be seen in the "Museum für Völkerkunde," are to have room found for them in the proposed Classical Museum, about to be erected, according to the designs of Prof. F. Wolff, on the so-called Museum Isle.——The newly-organised architectural society, "Vereinigung Berliner Architekten" (the greater part of the members of which were formerly active workers in the older institute, "Architekten-Verein zu Berlin"), held its first ordinary meeting on January 7. Among the members of this new Society we find many names of leading architects. President for the year is Herr von der Hude; vice-president, Reg.-Bm. March; hon. sec., Dr. Gurlitt; committee members, Messrs. Boeckmann, Ende, Fritsch, Kayser, Kühn, Orth, Raschdorff, and Schmieden. The Society is to be practical rather than artistic in its aims. Over 100 members have already joined.——The new hospital buildings of the clinical department of Professor Koch's new Institute are progressing rapidly, three of the "barracks" already being under roof. In spite of the intense cold, the works are being carried on night and day, without regard to expense.——Workmen's dwellings are to be erected in Berlin on the Peabody system at several central points in the city. The scheme, based on private enterprise, was intended to be carried out on a large scale. Financial difficulties have delayed it for the moment.——On account of the frequent dishonest dealing by jerry-builders and speculators, a meeting of the representatives of the building trades, &c., has been held for the purpose of deciding on means to ensure against loss. Besides a system of cash prepayment, a mutual insurance scheme was proposed.——The Berlin telephone communication, which is under Government control, has increased rapidly, some 150,000 subscribers being now attached to the system. The laying of some 4,000,000 mètres of wire underground has cost about 2,000,000 marks.

INFORMATION FOR EMIGRANTS.—In a circular issued from the Emigrants' Information Office, 31, Broadway, Westminster, S.W., it is stated that the January circulars, the penny and other handbooks, with maps, issued by the Office show the present prospects of emigration to the Colonies and one or two foreign countries. A *résumé* is hung up in every post-office in England, Ireland and Scotland, so that intending emigrants have no difficulty in obtaining information. There is no demand in Canada for men during the winter; emigrants should not arrive before April, when there is likely to be a demand for farm hands, carpenters, masons, and others in the building trade; female servants are always in demand. The chief demand in Australasia is for female servants, farmers, miners, navvies, farm hands, dairymen, ploughmen, gardeners other than fancy flower gardeners, bushmen, general labourers, and men who are well up in working land, pruning fruit-trees, shearing, and nursery work. There is no demand for mechanics in Queensland, South Australia, or New Zealand, and but little in the other Australasian Colonies, though the general strike is now over; but a good workman will always find employment. In South Africa, carpenters, masons, bricklayers, and other useful mechanics, navvies, farmers, men accustomed to work on the land, and female servants are in demand in Cape Colony and Natal, and may under certain conditions obtain reduced passages there. Clerks, shopmen, warehousemen, and women above the grade of servants are warned against emigrating to any of the Colonies, unless they go to situations already prepared for them.

SWITZERLAND.—The proposed National Museum, the decree for the formation and erection of which was passed by the Bundesrath last summer, is to be at Zürich—this city being considered by the authorities to be more suitable than Bern or Lucerne. The municipality of Zürich, expecting that their city would be selected, have had a preliminary design for the building made by M. Gustav Gull, and issued a photo-lithograph of the design as soon as the decision in favour of their city became known. The site chosen for the new museum buildings is on the Platz promenade. M. Gull's design shows a very picturesque block of buildings grouped round a large quadrangle. There will be 6,000 square mètres available for exhibiting purposes.——The municipal authorities of Lucerne are to have a monumental town-hall, with offices, on the Falkenplatz. The preliminary competition for designs, opened last summer, has been decided, the first prize (1,000 francs) falling to M. Meili-Wapf, of Lucerne, and the second to M. Emil Vogt, of Milan. Ten designs were submitted to the jury.

AUSTRIA.—We hear that an electric railway, between Pest and Budapest, is being planned, and that the preliminary concession has been granted by the Government.——A new bridge over the Danube has been thrown open at Pressburg. The bridge will be used for railway, carriage, and foot passenger traffic. The central span is 88 mètres wide, the side spans, 72 mètres.—*Deutsche Bauz.*

CHILI.—The new railway line between Concepcion and Lota was opened on January 1. A bridge of 1,889 mètres length (the longest in South America), resting on sixty-three piers, is on this line.——The provisionary railway bridges over the rivers Laja and Rio are being replaced by iron ones, the erection of which is in the hands of an English firm at Valparaiso.

NEW RUSSIAN CANAL AND PORT.—A company has been formed in Russia, with a capital of 100 million francs for the purpose of cutting through the Isthmus of Perekop, and thereby establishing direct connexion by sea between the Black Sea and the south-western basin of the great bay (the Azow Sea). The length of the canal is estimated at 110 versts. The breadth at the bottom will be 70 ft., and the depth 20 ft. It is to be finished in six years. A new port is also to be constructed in the Kola Peninsula, between the Arctic and the White Seas, and close to the Norwegian frontier, at a cost of 800,000 roubles.

CORFU.—The Empress of Austria is having a magnificent palace built at Corfu, in its own grounds, which are beautifully situated on the seashore. The palace, a three-story building with 128 rooms (with exterior façades of Romanesque type and interior decoration on Pompeian lines), has been designed by the Neapolitan architect, Signor Rafaele Charito, under whose superintendence the grounds have also been laid out. These grounds, having a superficial area of some 89,000 sq. mètres, enclosed by a garden wall of Ferarra marble, have been specially adapted for horticulture, and already show a collection of no less than 25,000 stocks of roses. The blocks of buildings for stables, servants' quarters, &c., are all planned on a large scale. It may be well to state that the lighting throughout the buildings and grounds is by electricity, and that a lighthouse placed on the head of the miniature harbour at the lower end of the grounds gives a light of 12,000 candles. Commenced in 1889, for an estimated cost of some 3,000,000 francs, the work is expected to be finished this spring.

THE INSTITUTION OF CIVIL ENGINEERS.—At the last meeting of the Institution of Civil Engineers, the Council announced that they had transferred Mr. W. Santo Crimp, Associate-Member, to the class of Member.

MISCELLANEOUS.

THE REGISTRATION OF PLUMBERS.—The London Registration Committee, acting in conjunction with the Worshipful Company of Plumbers, held its annual meeting on the 15th inst. The Master of the Company (Mr. W. H. Bishop), who presided, congratulated the Committee on the fact that the number of plumbers registered during the past year showed a considerable increase over the numbers for previous years. As evidence of the efficiency of their work, he mentioned that during the whole time the Committee had been in existence not a single authenticated case of wrong-doing on the part of a registered plumber had been brought before the Court. The number of members of the Metropolitan Committee was not large, but there were upwards of eight hundred members in the various registration committees acting in conjunction with the Company throughout the country. Referring to the question of the technical education of plumbers, he said that it was a question which had been discussed at numerous public meetings held in various parts of Great Britain and Ireland, and the Plumbers' Company had reason to believe that the requisite funds would shortly be forthcoming to enable them to give practical effect to the educational scheme which they had prepared, in conjunction with a number of prominent educationists. At one of the public meetings referred to, Dr. Alfred Hill, Medical Officer for Birmingham, had said:—"It was no use having good sanitary arrangements and sanitary inspectors unless the plumbing work was well done. The Health Committee wanted really to make the plumbers their technical assistants." It was hoped and believed that one result of the educational scheme he had referred to would be to meet this want.—Mr. Alderman Knill (Past Master) paid a warm tribute to the honorary examiners, upon whose ability, energy, and strict impartiality the success of the registration movement, he said, so largely depended.—Sir Philip Magnus referred to the very large increase in the attendance at the plumbing classes, and stated that there were now about 1,300 students in these classes throughout the United Kingdom. He directly attributed this increase to the efforts of the Plumbers' Company in connexion with the National System of Training and Registration of Plumbers. — Several examiners, including Mr. John Smeaton (master plumber, member of the Court of the Company), Mr. W. Titmas (master plumber), and Mr. R. A. Nurse (United Operative Plumbers' Association of Great Britain and Ireland) stated that they had found that many of the plumbers who came up for examination had no idea how to set about their work properly, because they had never received the requisite technical instruction. Mr. C. T. Millis (Director of Technical Classes at the Finsbury Technical College and the St. Stephen's Technical Institute, Westminster), and Mr. J. Browning (operative plumber), were amongst the other speakers.

JERRY-BUILDING IN BOMBAY.—On the 17th Dec., a five-storied dwelling-house in Bombay collapsed without warning, whereby twenty-nine of its inmates were killed, and nearly forty badly injured. At an adjourned inquest, Mr. Rienzi Walton, Executive Engineer to the Municipality, said he had examined the *débris* and most of the timber-work was old stuff. The bricks were of inferior quality, but the mortar adhering to the bricks was for the most part good. The structure was a frame building with the spaces filled in with masonry. The house was constructed in accordance with the by-laws framed under the Municipal Act of 1878. Under this Act there was absolutely no authority to enforce any dimensions with regard to timber, walls, height, or any matter relating to structure. The Building Department of the Municipality has for years appended to its building forms a schedule of dimensions which are deemed to be essential for the stability of buildings. There is no authority to enforce them and they are limited merely to suggestions. A local contemporary remarks that, in its opinion,—"Whatever the Coroner's inquiry may reveal as to the construction and material of the building which collapsed without warning yesterday morning, the moral responsibility for the catastrophe rests ultimately with the Corporation."—*Indian Engineer.*

A REMARKABLE THEFT.—On awaking the other morning the dwellers in the Allée Verte, in Brussels, were surprised to find that the paving-stones in the roadway for some 300 yards had entirely disappeared. The stones, over 10,000 in number, had been broken out and carted away in the night, the police on duty in the avenue refraining from interfering with the thieves in the belief that they were municipal paviors at work. Neither the thieves nor the paving-stones have been discovered.

THE PANAMA CANAL.—A correspondent, writing from Panama, states that the work executed for the canal is gradually being obliterated. There are now hardly any traces of the excavations, whilst the valuable machinery is fast rusting away, and will soon be worthless.

THE CLERKS OF WORKS' ASSOCIATION OF GREAT BRITAIN.—The eighth annual dinner of this Association will take place at the Holborn Restaurant on Monday, February 9, Mr. Charles Barry, F.R.I.B.A., F.S.A., in the chair.

CONTRACTS AND PUBLIC APPOINTMENTS.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Fire-clay Retorts, Fire-bricks, Clay, &c. for Gasworks	Sowerby Bridge L. B.	J. Marsland	Jan. 27
Cemetery Improvement Works, Aberlour, N.B.	Major M'Gowan	.....	do.
Copper Plates, Boiler Tubes, Steelwork, &c. for Bridges	India Office	*Official*	do.
*Roadmaking Works	Vestry of St. Mary Abbotts, Kensington	do.	do.
Cutting Track and Laying Pipes, Bothwell Waterworks	Committee of Middle Ward of Lanark	J. & A. Leslie & Reid	do.
Pipe Sewers, with Manholes, &c.	Ashby-de-la-ZouchRSA	J. W. Metcalf	do.
Two Dwelling-houses, Stabling, &c. Doncaster		.....	do.
Timber (deal-ends)	Burtonshaw & Tovey	*Official*	do.
*Road Materials, Oil	Southampton Union	E. Reeve Boulter	Jan. 28
*Roadmaking and Paving Works	Bexley Local Board	H. Mair, C.E.	do.
Meter House, Kennedy's Meter, Fittings, &c.	Hammersmith Vestry	*Official*	do.
Brickwork, &c., and Iron Gates and Gate Posts, Campfield	Castleford Local Board	do.	do.
Gas-pipe Railing, with Cast-iron Standards, &c.	Manchester Corp.	do.	do.
Alteration of Central Market	Salford Corporation	do.	do.
Furnishing, Fitting, &c. New Council Chamber, Guildhall, York	do.	do.	Jan. 29
*Works and Materials (one year)	York Corporation	G. S. Doughty	do.
Cast-iron Gutters, Pipes, &c.	Chelsea Vestry	T. W. E. Higgens	do
Additions to School	Indian Midland R. Co.	*Official*	do.
Laying Water Mains (7 miles) with Meter Chambers, &c.	Llangeinor Sch. Bd.	G. F. Lambert	Jan. 31
New Wing to Residence, Seaton	Wakefield U.R.S.A.	F. Massie	do.
Vertical Engine and Boiler, Parc Gwyllt near Bridgend	Mr. Willans	E. H. Harbottle	do.
*Paving Works	Glamorgan County Asylum	*Official*	do.
*Alterations to Lavatories, &c.	Farnham Local Board	R. F. Hankins	Feb. 2
*Erection of Lodge	St Mary (Newington) Vestry	*Official*	do.
Ironwork for Carriages Wheels, Axles, &c.	Rattersea Burial Bd.	do.	do.
*Day and Jobbing Works to Sewers, &c.	Bombay, Baroda, and Cent. India Ry. Co.	do.	do.
*Broken Granite	Paddington Vestry	do.	do.
*Granite Kerb, York Paving, and Granite Cubes	do.	do.	do.
Extension of Municipal Buildings	do.	do.	do.
*Tar-paving Works, Grand Parade	Nelson (Lancashire) Corporation	T. A. Crowther	do.
*Works and Repairs to Sewers, Drains, &c.	Eastbourne Twn Coun.	C. Tomes	do.
*Sewers Work, High-street, Poplar	Limehouse Bd. of Wks.	*Official*	do.
*Sewers Work, The Grove, Hammersmith	LondonCountyCouncil	do.	Feb. 3
*Widening Timber Jetty at Barking Outfall Works	do.	do.	do
New Post Office, Paisley	do.	do.	do.
*Works and Materials	Com. of H.M Wks, &c.	do.	do.
*Roadmaking Works	Westminster Vestry	G. R. W. Wheeler	do.
*Cast-iron Water-pipes	Tottenham Local Bd.	J. R. Worth	do.
	Brampton U.R.S.A.	J. Reay	Feb. 4

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Road Materials	Hull Corporation	*Official*	Feb. 4
*Works and Materials (one year)	Hampstead Vestry	C. H. Lowe	do.
Cast-iron Water-pipes and Valves	Port Elizabeth (Cape Colony) Town Coun.	J. Wolfe Barry	Feb. 6
*Battery and Drill Shed, Greenock	Admiralty	*Official*	do.
New Infant School and Walls, Dufftown	Mortlach School Board	Geo. Sutherland	do
Villa Residence, Dalhenna, Invearry, N.B.	Jas. Wyllie	.....	Feb. 7
Enlargement of Christ Church, Hanham, Bristol	The Vicar	.....	do.
*Supply of Road Materials	Com. of H.M. Wks, &c.	*Official*	Feb. 9
*New Hospital, North Heigham	Norwich Corporation	P. P. Marshall	Feb. 10
*Works and Materials	Battersea Vestry	J. T. Pilditch	do.
*Agricultural Drainage	LondonCountyCouncil	*Official*	do.
*Building a Weir, &c, &c.	do.	do.	do.
*Alterations and Additions to Boiler-house	do.	do.	do.
Three Semi-detached Villas, Holywell Green, Halifax	.....	C. F. L. Horsfall & Son	Feb. 12
*Brick Chimney Shaft	Smith & Grace	Smith & Grace	do.
*Re-erection of Stabling	Lewisham Union	*Official*	do.
Ironwork, Carriage Fittings, &c.	Belfast and Northern Counties Ry. Co.	*Official*	Feb. 13
*New Municipal Buildings	Sheffield Corporation	G. W. Mountford	Feb. 17
*Erection of Infant School	Loughton School Board	J. Cubitt	No date
Excavating Block of Property, Hunslet-road, Leeds	Wm. Greenwood	.....	do.
Twelve Houses, Bombay and Madras-streets, Leeds	.....	Albert Dixon	do.
Detached Villa, Gledhow	C. Howson	J. Hall & Sons	do.
Eleven Houses, Holbeck, Leeds	.....	Buckton & Co.	do.
New Premises, South Shields	E. Moncrieff & Son	J. W. Donald	do.
New Offices, Cattle Market, Northampton	Northampton Corp.	*Official*	do.
*Constructing Road, Halstead	War Department	do.	do.
*New Buildings, Sheerness-on-Sea	.....	W. M. L. Seaman	do.
New Shop, Show-room, Work-room, &c.	Doncaster Corporation	H. Athron	do.
New Schools, Esh Colliery, Durham	Pease & Partners	Clark & Moscrop	do.
Residence, Bloomfield, Ireland	Mr. Petticrew	Young & Mackenzie	do.
Additions and Alterations to "Nether-hall," Maryport	.....	C. J. Ferguson	do.
Bridge at Langley Burn, Bewcastle	Longtown Highway Bd.	R. Maxwell	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Applications to be in
*Manual Trainer	Central London Dist. School, Hanwell	2*l.*	Jan. 30
*Inspector of Water Fittings	Tottenham Local Bd.	2*l.* 2*s.* weekly	Jan. 31
*Inspector of Nuisances	Hanley Corporation	104*l.*	Feb. 3
*Six Superintendents of Main Roads, Bridges, and Buildings	Governmt of Jamaica	200*l.*	Feb. 19
*Tap Examiner	Weymouth Waterwks	Not stated	No date

Those marked with an Asterisk (*) are advertised in this Number. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, p.* xviii. *and* xix.

THE CARPENTERS' COMPANY.—A course of free lectures on matters connected with building will be delivered at Carpenters' Hall, London Wall, on the following Wednesday evenings, at eight o'clock p.m., viz.:—February 11, Prof. H. Robinson, M.Inst.C.E., on "Sanitary and Insanitary Dwellings;" Sir John Coode, K.C.M.G., in the chair. February 18, Professor T. Roger Smith, F.R.I.B.A., on "Failure of Buildings;" Mr. A. Waterhouse, R.A., F.R.I.B.A., in the chair. February 25, Prof. J. W. Groves, F.L.S., on "Timber: its Growth and Decay;" Sir J. C. Lawrence, Bart., in the chair. March 4, Prof. J. M. Thomson, F.C.S., F.R.S.E., on "Chemistry of Building Materials, with Experiments;" Mr. C. Barry, F.S.A., F.R.I.B.A., in the chair. March 11, Mr. Thomas Blashill, F.R.I.B.A., on "The Carpenter as House-builder, with Illustrations;" the Rev. Henry Wace, D.D., in the chair. March 18, Prof. Banister Fletcher, F.R.I.B.A., on "Architecture, and its Civil and Commercial Value;" the Right Hon. Sir J. Lubbock in the chair. Cards giving full particulars can be obtained at the Hall and at all the large builders'; also of the Secretaries of the Royal Institute of British Architects, and the Architectural Association, 9, Conduit-street, W.C.; at the Architectural Museum, Tufton-street, Westminster; and at the Working Men's Club and Institute Union, 150, Holborn, E.C.——At a recent meeting of the Court of the Worshipful Company of Carpenters, a vote of 50 guineas was made to the Irish Distress Fund. Subscriptions were passed for the current year to the undermentioned Institutions, viz.:—City and Guilds' Institute, 500*l.*; Builders' Benevolent Institution, 26*l.* 5*s.*; London Hospital, 70*l.*; to the Great Northern, King's College, Ophthalmic, Royal Free, and Charing-cross Hospitals, 10*l.* 10*s.* each. To the National Lifeboat Institution, Royal Blind Pension Society, City of London Truss Society, Hospital for Incurables, Reedham Asylum, School for Indigent Blind, Asylum for Idiots, London Orphan Asylum, Watford Strangers' Friend Society, Scripture Readers' Association, 10*l.* 10*s.* To the Stratford, West Ham, and Essex Dispensaries, All Saints' Convalescent Home, Eastbourne; Bexhill Convalescent Home, Hospital for Diseases of the Skin, Mr. Wardell's Convalescent Home for Scarlet Fever, Children's Convalescent Home, Hastings; National Benevolent Institution, United Beneficent Society, Hospital for Paralysed and Epileptic, Merchant Seamen's Orphan Asylum, Railway Institution, and the Charity Organization Society, 5*l.* 5*s.* each.

LONDON AND FOG AND SMOKE.—Mr. Assiter writes to say that his remarks on this subject quoted in our last were not in the form of a paper read at the meeting referred to, but remarks in seconding a vote of thanks. The *resumé* sent to us conveyed the impression of being a report of three successive papers. We did not print the *resumé* of the principal paper by Mr. R. Macintyre, because it went on the assumption that London fog is caused by London smoke and can be stopped by smoke legislation, which is an assumption entirely contrary to facts, and therefore arguments based on it are of no value.

IMPROVEMENTS AT BELFAST.—From the office of the City Surveyor of Belfast (Mr. J. C. Bretland) we have received a return of the principal works executed in his department during the year 1890. They include, besides a large quantity of new paving and flagging, and renewals and repairs of old paving, the widening and improvement of a great many streets. The works embodied in Contract No. 1, under the Main Drainage Act, have not as yet been finished, owing to unexpected delay, but it is expected that they will shortly be completed. Contract No. 2, which includes the construction of the high-level intercepting sewer, as far as Divis-street, has been in progress during the year, and is expected to be finished early in the spring. The tunnelled work has all been executed. Contract No. 3, which comprises the erection of the Duncrue-street pumping-station, is being rapidly pushed forward, and the engines and boilers are being constructed. Contract No. 4, for the construction of the low-level intercepting sewer along Duncrue-street, is also in progress. In view of the Reclamation Embankment in Contract No. 1 being shortly closed in, the contract drawings for the storage reservoir and auxiliary pumping-station are being prepared. The new Albert Bridge has been opened to the public, and two granite approach walls at each side of the bridge on the County Down side of the river are being proceeded with. The New Quay wall along the River Lagan, between the Queen's Bridge and the Great Northern Railway Bridge, is still in progress, and is expected to be shortly finished. The new covered market has been completed, the fittings made, and the market opened for public use. The site of Dunville Park has been taken over, the buildings thereon removed, and ornamental gates and railings for enclosing the park are being erected. Several other improvements of a minor nature have been made in the various parks. The number of buildings of which plans were approved in the year 1889 was: County Antrim side, 1,489; County Down side, 761; total, 2,250. The number of buildings of which plans were approved in the year 1890 was: Country Antrim side, 1,739; County Down side, 1,216; total, 2,955. The area of the city is 6,805 acres; the number of streets is 1,700; and their total length is 150 miles. The total valuation of the city on January 1 last was 688,825*l.* The total valuation on January 1, 1862, was 279,087*l.*, showing an increased valuation in twenty-nine years of 409,738*l.* During the same period (twenty-nine years) there were 37,044 new buildings erected in Belfast.

FOY, MORGAN, & CO.'S ANNUAL WOOD REPORT, 1890.—Messrs. Foy, Morgan, & Co., in their annual report, say:—"The past year has been an unfortunate one for the wood trade, inasmuch as prices had a downward tendency from January to October, and importers, as a rule, have done badly in consequence. The drop on f.o.b. prices since the early months of the year has been fully 20 per cent., notwithstanding that freights have been moderate and consumption very good. Many of the shippers, who were too sanguine to accept the really capital figures current in January and February, were compelled in August and September to take nearly 25 per cent. less on the common qualities and low-priced goods, and the *sauve qui peut* which took place had a most damaging effect on both the London and the coast markets. The outlook now is certainly healthy, as buyers willingly offer a considerable advance on the lowest figures current in the autumn. With the wonderful consumption which has been going on stocks are already within reasonable bounds. If an enormous quantity of cheap goods had not been most unwisely forced on the London market, and the financial panic in October had not taken place, there is little room for doubt that the market would have been much firmer and prices considerably higher than they now read. Should the f.o.b. prices for 1891 be moderate, and the element of speculation be judiciously checked, it seems likely that the season will open with brighter prospects for importers than has been the case for several years. Failures have not been numerous, and the trade has proved itself far sounder than many would have supposed after the rough times it has lately undergone." The report then proceeds to give in great detail the statistics of the year's trade.

THE DANGERS OF PORTABLE STOVES.—The dangers of portable-stoves have been curiously illustrated in Copenhagen. One morning the inhabitants of second, third, and fourth stories in a building were found partly suffocated, and were restored with difficulty. No smell or smoke could be noticed, nor had any fire been lighted for some days in the grates of either story. However, on the first floor there was a portable-stove alight for some days, and to this the fumes were traced, although the residents there felt no ill-effects. This is thus explained. The chimney into which the flue had been run being situated in an exposed part of the building, and there having been no fires for some time, was exceedingly cold, and the gases from the stove being unable to warm it, and thereby create a draught, they had been forced down the chimneys into the other stories.

PHILIP'S MAP HOLDER.—Messrs. Philip & Son send us a description and illustration of what they term their "Signal Map Holder," in which a certain number of large-scale maps for general use are mounted on rollers which are hinged to an upright wooden standard which forms a folding case for them. The maps are displayed by raising and extending the rod bearing the rollers at right angles to the standard case, like a railway semaphore; when not in use the maps are all rolled up to the rods, which drop into the standard, and only show a pillar-shaped case standing on the floor. The arrangement is both neat and convenient.

THE ENGLISH IRON TRADE.—If anything, there has been a relapse in the English iron market, which continues rather quiet, without, however, prices being seriously affected. The Glasgow warrant market has been inanimate, but warrants have been tolerably steady. Cleveland pig-iron has been forced down 6d. a ton by buyers, who purchase but sparingly, with makers holding back, believing, as they do, with some show of reason, that values will recover with the advent of the Spring trade. Shipments are at present small, owing to the continuance of the severe weather and the reserve of foreign consumers. Hematite pig is quieter, with an easier tone. Business in finished iron and steel is moderate, but manufacturers have a fair amount of work in hand. Little can be said respecting the shipbuilding trade, excepting that new orders are scarce. The condition of the engineering branches of industry is fairly satisfactory.—*Iron.*

MEETINGS.

SATURDAY, JANUARY 24.

Royal Institution.—Mr. W. Martin Conway, M.A., F.S.A., on "Pre-Greek Schools of Art." I. 3 p.m.

MONDAY, JANUARY 26.

University College (Archæology).—Mr. W. St. Chad Boscawen on "Babylonian Archæology and Art." II. 5 p.m.

Society of Arts (Cantor Lectures).—Mr. A. J. Hipkins, F.S.A., on "The Construction and Capabilities of Musical Instruments." I. 8 p.m.

Leeds and Yorkshire Architectural Society.—Sketching Club Evening. Exhibition of sketches, casts, &c. 7.30 p.m.

TUESDAY, JANUARY 27.

Society of Arts (Applied Art Section).—Mr. William Simpson on "Lithography: A Finished Chapter of Illustrative Art." 8 p.m.

Institution of Civil Engineers.—Mr. J. F. Spencer on "Machine Stoking." 8 p.m.

WEDNESDAY, JANUARY 28.

South Kensington Museum (Lecture Theatre).—Mr. Maurice Hewlett on "The Rise of the Renaissance in England." IV. 3.45 p.m.

Society of Arts.—Mr. Carmichael Thomas on "Illustrated Journalism." 8 p.m.

THURSDAY, JANUARY 29.

Institution of Mechanical Engineers.—Annual General Meeting. 7.30 p.m.

Society for the Encouragement of the Fine Arts.—Mr. P. H. Newman on "The Chronology of Costume." 8 p.m.

Society of Antiquaries.—8.30 p.m.

Edinburgh Architectural Association.—Mr. T. F. Binnie on "Are Architects and Builders Adversely Affected by the Present System of Feu-Duties and Taxation." 8 p.m.

FRIDAY, JANUARY 30.

Institution of Mechanical Engineers.—Annual General Meeting (continued). 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Sir Douglas Galton, F.R.S., on "Ventilation, Warming, and Lighting." 8 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. E. L. Hill on "The Counterbalancing of Locomotive Engines." 7.30 p.m.

SATURDAY, JANUARY 31.

Royal Institution.—Mr. W. Martin Conway, M.A., F.S.A., on "Pre-Greek Schools of Art." II. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

20,528.—WINDOW SASH "SILENCER": *E. H. Young.*—The apparatus which is the subject of this patent is made and fixed so as to act as a strut, separating the two sashes, while simultaneously forcing the top sash against the outer bead, and the bottom sash against the inner bead. The appliance itself is made hinged in the centre, and while one part is screwed on the top rail of the lower sash, the other is forced against the centre bar of the window.

1,678.—FIRE GRATES: *C. M. Sansom.*—According to this invention, a block or plate of fire clay is supported over the fire and projects upward at an acute angle towards the front of the grate. This plate retains the heat, radiates it, and economises fuel.

1,729.—WATER METER: *J. Merrill.*—This appliance is to be used where a cistern or other vessel discharges a known quantity of water at varying intervals. A float is attached to a rod or lever working upon a joint-pin arranged to work in conjunction with and to operate a train of wheels communicating with pointers which register the figures on dials each time the lever is raised and lowered, thereby indicating the quantity of water used.

1,900.—ROOF-COVERING: *J. & A. Drexler* (Vienna).—The covering which is the subject of this patent is formed of sheet metal-plates, so fixed to the lathing as to present a corner at top, the attaching to the roof being performed by a strip of sheet-metal inserted under a flap formed at the upper corner of the plate, and folding against the front surface of the same. Narrow marginal strips along the edges of the upper half of the polygonal sheet metal-plate are folded against the upper side, and similarly the edges of the lower half are folded against the lower side, the corners of the plates being first cut so as to prevent over-lapping.

2,371 and 2,371*a*.—BRICKS, AND SUBSTITUTE FOR FIRE CLAY: *C. H. Edwards.*—In the first specification the utilisation of waste sand from glass works, and in the second the use of sea sand and ordinary sand for brick-making is described. Both processes are similar. "Pit warrants," or the clay shale found in local pits, are ground with sand and water to bind the whole together. The mixture is then made into bricks and burned. The bricks must be well burned.

17,853.—GLUE COMPOUND: *T. O. Butler.*—According to this specification, common glue, Paris white, and sulphur are mixed together through the medium of water and heat, and form a compound having great tenacity, and useful for light woods by reason of its whiteness.

NEW APPLICATIONS FOR PATENTS.

January 5.—169, N. Dennys, Anti-Fouling Paint for Submerged Surfaces of Wood, &c.

January 6.—221, J. Parr, Scraping and Cleaning Chimneys, Chimney-pots, and Flues.—231, J. Lloyd, Glaziers' Diamonds.—238, W. Sescombe, Brick-burning Kilns.—277, A. Lees, Curing Smoky Chimneys, &c.

January 7.—291, T. Potter, Combined Fire-resisting Concrete Floors and Ceilings.—292, D. Knowles and E. Raybone, Sash-fasteners.—312, F. Holloway and E. Bastin, Tie-Bricks.

January 8.—355, H. Dent, Brickmaking Machinery.

January 9.—401, S. Adams, Sanitary Closets.—417, W. Williams, Hanging Window-sashes.—418, J. Armitage, Sign-boards, &c.—431, W. Perkins, Mitreing or Bevilling Machines for Wood-working.—462, A. Binnie, Stoves and Fireplaces.

January 10.—473, A. Spurrier, Fireplaces.—509, W. Munns, Windows.—524. T. Hayton, Paving-slabs, &c.—529, F. Schlüchtner, Speaking-tubes.—535, G. Wise, Condensation-channel for Glazed Sashes. &c.—537, E. Brown, Door-handle Fastenings.

PROVISIONAL SPECIFICATIONS ACCEPTED.

16,305, A. Ross, Water Cisterns, &c.—18,787, W. Calway, Ventilation of Houses, and of Roofs of same.—19,249, J. Winterflood, Ventilating Geysers.—19,306, T. Switzer, Mitreing Mouldings.—19,594, G. Boisselier, Preparing Mosaic and other Slabs, Tiles, &c.—19,871, W. Bryan, Water-waste Preventer.—20,118, A. Downie, Planing-machines.—20,229, F. Chopping, Windows, Fanlights, and Doors.—20,559, W. Moncrieff, Water-waste Preventing Cistern.—20,661, J. McGlashan, Ventilating and Chimney-cowls.—20,789, J. Bayly, Flushing Apparatus.—20,799, J. Bayly, Brick-kiln.—20,814, T. Clarke, Chimney Pots.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

1,755, A. Tomkins, Portable Slow Combustion Stoves.—3,657, R. Morris, Door Checks.—5,310, A. Sharp, Roofing with Slates with or without Putty.—17,503, J. Bayly, Drying Clay Products and other Materials.—17,795, F. Oschwald, Building Material.—19,645, R. Gardner, Sash Balances.—19,958, R. Böhme, Serrated Stones or Bricks for Floors, Sills, Ceilings, &c.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

DECEMBER 22.—By *Weatherall & Green:* F.g.r. of 21*l.* 5s., with reversion in 93 yrs., Wandsworth, 400*l.*; f.g.r. of 21*l.* 5s., with reversion in 93 yrs., 400*l.*

JANUARY 12.—By *Weatherall & Green:* 1 and 4, Catharine-ter., Kensington, u.t. 13 yrs., g.r. 6*l.* 9s., r. 65*l.*, 305*l.*

JANUARY 13.—By *Rogers, Chapman, & Thomas:* 6, St. George's-sq., Belgravia, u.t. 40 yrs., g.r. 13*l.*, 750*l.*

JANUARY 14.—By *Lound & Howitt:* "The Manbey Arms," and a plot of land, f., Stratford, 3,350*l.*; 21, Water-lane, f., r. 22*l.*, 320*l.*

JANUARY 15.—By *Reynolds & Eason:* 20 and 22, Coronet-st., Hoxton, f., r. 65*l.*, 500*l.*: 25, Baches-st., u.t. 37 yrs., g.r. 45*l.*, 360*l.* By *Newbon & Harding:* 82, St. Peter-st., Islington, f., r. 40*l.*, 540*l.*; 20, Shrubland-grove, Dalston, r. 30*l.*, and l.g.r. of 10*l.*, u.t. 51 yrs., 290*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Greenheart, B.G. ....ton	6	15	0	7	5	0
Teak, E.I. ....load	10	0	0	13	0	0
Sequoia, U.S. ....foot cube	0	2	3	0	3	0
Ash, Canada ....load	2	10	0	4	5	0
Birch ,, ...	2	5	0	4	5	0
Elm ,, ...	3	10	0	4	15	0
Fir, Dantsic, &c.	2	0	0	3	15	0
Oak ,, ...	2	10	0	4	10	0
Canada	4	17	6	6	10	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	2	0	0	5	10	0
Lath, Dantsic ....fathom	5	0	0	6	0	0
St. Petersburg	5	0	0	7	0	0
Deals, Finland, 2nd & 1st. std. 100	7	10	0	10	0	0
,, ,, 4th and 3rd	7	0	0	7	5	0
Riga	6	0	0	8	0	0
St. Petersburg, 1st yellow	9	10	0	14	10	0
,, 2nd ,, ...	7	10	0	9	0	0
,, white	7	0	0	10	0	0
Swedish	7	0	0	15	10	0
White Sea	8	0	0	17	0	0
Canada, Pine, 1st	13	0	0	24	0	0
,, ,, 2nd	9	0	0	16	0	0
,, ,, 3rd, &c.	7	0	0	10	0	0
,, Spruce, 1st	8	10	0	10	10	0
,, ,, 3rd and 2nd ..	6	10	0	8	0	0
New Brunswick, &c.	5	10	0	7	10	0
Battens, all kinds	4	10	0	15	10	0
Flooring Boards, sq., 1 in., prepared, First	0	10	0	0	14	0
Second	0	8	0	0	10	6
Other qualities	0	5	6	0	7	9
Cedar, Cuba ....foot	0	0	4	0	0	5
Honduras, &c.	0	0	3½	0	0	4½
Mahogany, Cuba	0	0	4½	0	0	6½
St. Domingo, cargo average ..	0	0	4½	0	0	6½
Mexican ,, ...	0	0	4½	0	0	5½
Tobasco ,, ...	0	0	5½	0	0	6½
Honduras ,, ...	0	0	5½	0	0	6½
Box, Turkey ....ton	4	0	0	13	0	0
Rose, Rio	12	0	0	19	0	0
Bahia	10	0	0	18	0	0
Satin, St. Domingo ....foot	0	0	9	0	1	3
Porto Rico	0	0	10	0	1	6
Walnut, Italian	0	0	4	0	0	7

METALS.	£.	s.	d.	£.	s.	d.
IRON—Bar, Welsh, in London tn	6	5	0	6	15	0
,, ,, at works in Wales	5	15	0	6	5	0
,, Staffordshire, in London..	6	5	0	7	0	0
COPPER—British, cake and ingot	56	10	0	57	10	0
Best selected	59	0	0	60	0	0
Sheets, strong	66	0	0	0	0	0
Chili, bars	53	10	0	0	0	0
YELLOW METAL....lb.	0	0	6	0	0	6¼
LEAD—Pig, Spanish ....ton	12	17	6	13	0	0
English, com. brands	0	0	0	0	0	0
Sheet, English, 3 lbs. per square foot and upwards....	15	0	0	15	5	0
Pipe	15	10	0	0	0	0
ZINC—English sheet ....ton	26	0	0	26	10	0
Vieille Montagne	27	0	0	0	0	0
TIN—Straits	91	15	0	0	0	0
Australian	92	0	0	0	0	0
English Ingots	94	10	0	0	0	0

OILS.						
Linseed ....ton	21	10	0	0	0	0
Cocoanut, Cochin	33	10	0	34	0	0
,, Ceylon	28	10	0	29	0	0
Palm, Lagos	25	10	0	0	0	0
Rapeseed, English pale	29	5	0	29	10	0
,, brown	27	10	0	0	0	0
Cottonseed, refined	18	0	0	0	0	0
Tallow and Oleine	21	0	0	40	0	0
Lubricating, U.S.	6	0	0	7	0	0
,, refined	7	10	0	12	0	0
TAR—Stockholm ....barrel	1	1	6	1	2	0
Archangel	0	14	6	0	0	0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BASCHURCH (Shropshire).—For the erection of Petton Hall, Baschurch, near Shrewsbury, for Captain E. B. Cunliffe. (Contract No. 1, main building, exclusive of walling, bricks, grates, chimney-pieces, and electric light, and not including stables and lodges.) Mr. Thomas Bower, architect, Nantwich. Quantities by Mr. Henry Lovegrove, London:—

J. Stringer	£22,670	R. Beckett, Hartford, Cheshire*	£18,291
Kirk & Randall	22,300		
Treasure & Son	19,138		

* Accepted.

CLAPHAM.—For finishing for occupation six houses in Nightingale-square, for "The Suburban Lands Syndicate." Mr. Thomas Spink, surveyor, 26, Charing-cross, S.W.:—

Winckley	£785 0	Lawrence	£686 0
Brett	732 0	Edwards	597 0
Eyer	730 0	Wheeler & Co., Peckham Rye (accepted)	525 10
Rowsell	698 0		

HERTFORD HEATH.—For the construction of pipe outfall sewer, with manholes, &c., near Great Amwell, for the Ware Union Rural Sanitary Authority. Messrs. Bailey Denton Son, & North, engineers, Palace-chambers, Westminster, S.W. Quantities by the engineers:—

George Bell	£866 12 0	Vase Bros.	£639 14 3
Solden Hipwell	725 0 0	W. Gray	639 12 4
Porter & Co.	716 14 6	J. Jackson	639 0 0
Iles & Co.	699 0 0	J. G. Bloomfield	580 15 0
J. South	698 18 0	J. G. Potter	580 0 0
J. Kavanagh	671 0 0		

IRVINE, N.B.—For cutting track and pipe-laying from filter-beds to the burn, with relative works, for the Irvine Corporation. Messrs. J. & A. Leslie & Reid, engineers, 72a, George-street, Edinburgh:—

R. Cameron	£2,560 13 11	W. S. Osborne	£2,130 15 9
R. Sharp	2,517 9 7	J. Urquhart	1,998 10 9
R. B. Stewart	2,228 18 0	Nimmo & Coupar	1,825 11 3
R. C. Brebner	2,145 9 6		

KEITH, N.B.—Accepted offers for repairs to the Manse of Boharm, Keith, N.B., for the Heritors of the Parish. Mr. F. D. Robertson, architect, Fife, Keith:—

Thos. Stewart, Keith, *Mason work*	£227 0 0
James Dey, Forkins, *Carpenter work*	135 0 0
A. & R. Wright, Keith, *Slater work*	61 0 0
Geo. McKay, Keith, *Plaster work*	26 10 0
James Ross, Elgin, *Plumber work*	72 15 0
Campbell Anderson, Keith, *Painter work*	35 0 0
Total	£557 5 0

LEEDS.—For the extension of the school at Hunslet Carr, for the School Board. Mr. William Landless, architect:—

Cross & Carter, Bowman-lane, Leeds*	£745 0 0

* Accepted for all trades.

LEEDS.—Accepted for work in the erection of four houses and shop at Armley. Mr. C. Frederick Wilkinson, architect, 35, Park square, Leeds:—

Plumber and Glazier, Jno. Fawcitt, Leeds	£81 10 0
Plasterer, J. Walsh, Armley	61 10 0
Slater, J. Atkinson & Son, Leeds	26 0 0
Painter, B. Beaumont, New Wortley	22 0 0
Total	191 0 0

LEEDS.—Accepted on schedule of prices for the erection of six houses near Queen's-road, for Mr. Joseph Popplewell. Mr. Thos. Howdill, architect, 13, Oxford-row, Leeds:—

Winterburn & Thackwray, *Builders*, Woodhouse.
J. Ledgard & Son, *Joiners*, Ventnor-street.
J. Atkinson & Son, *Slaters*, Whitehall-road.
J. Fox, *Plumber*, Hunslet-lane.
W. J. Haddock, *Plasterer*, Tong-road.
E. H. Walker, *Painter*, Thackley.

LONDON.—For the erection of warehouse, at Friar-street, St. Andrew's Hill, for Messrs. Judd & Co. Mr. J. Douglass Mathews, architect:—

Downs	£2,738	Nightingale	£2,187
Jerrard	2,262	Grover & Son	2,080
Williams	2,246	Killby & Gayford	1,987
Lawrence	2,234		

LONDON.—For the erection of the Christian Institute, No. 19, Coronet-street, Hoxton, for Mr. W. R Woodhouse. Mr. N. Tuxford, architect, 5, Arundel-street, Brighton:—

Coldwell & Sons	£2,050	Lawrence	£1,839
Lascelles	1,960	Nightingale*	1,790
Clark & Bracey	1,859	S. Goodall	1,756

* Accepted.

LONDON.—For the erection of a pair of villa residences at 45 and 47, Clapham-road, S.W., for Mr. W. Elmore. Professor Banister Fletcher, architect, 29, New Bridge-street:—

H. J. Williams	£2,961	B. E. Nightingale	£2,689
Brass & Son	2,828	J. Garrud	2,646
Pocock Bros.	2,793	J. Godfrey & Son*	2,616
Hollingsworth	2,730		

* Accepted.

LONDON.—For alterations and additions to 6, Blue Cross-street. Professor Banister Fletcher, architect, 29, New Bridge-street, E.C.:—

Hollingsworth	£687	Burman & Sons	£640
H. J. Williams	685	W. & H. Castle*	328
J. Wynne	650		

* Accepted.

LONDON.—For alterations and additions to "The Crown" Hotel, Cricklewood, for Mr. A. W. Paul. Mr. Alfred J. England, architect, 38, Southampton-street, Strand :—
H. B. Oldrey, Albert Works, Kilburn (accepted) £2,400 0 0
[No competition.]

LONDON.—For alterations and additions to shop and lavatory at 20, High-road, Kilburn, for Mr. Charles B. Allen :—
H. B. Oldrey, Albert Works, Kilburn (accepted).. £256 0 0
[No competition.]

LONDON.—For building factory in rear of 241, Hackney-road, E., for Mr. Jacobs. Messrs. T. & W. Stone, architects :—

Warland	£793 15 0	Thomerson & Son	£533 0 0
Higgs	676 0 0	Hughes	520 0 0
Beale	609 0 0	Jarvis & Sons	417 0 0
Wire	599 0 0		

LONDON.—For alterations at No. 226, Upper-street, Islington, N. Mr. Charles Bell, architect. Quantities by Mr. H. Lovegrove :—

	General.	Red Mansfield.	Red Bricks.
Goodman	£399	£160	£140
Patman & Fotheringham	373	155	97
Scharin & Co.	343	145	136
Scrivener & Co.	342	158	111
Dove Bros. (accepted)	345	150	170

LONDON.—Accepted for pewterer's work and fittings, "Rising Sun," Commercial-road, Pimlico, for Messrs. Young & Co., Wandsworth. Mr. Keith D. Young, architect, 17, Southampton-street, Bloomsbury : —
Sanders & Sons, 228, High Holborn £169 15 0

LONDON. — For erecting boundary wall, railings, entrances, &c., to St. Botolph's, Aldgate, for the Commissioners of Sewers of the City of London. Mr. W. Haywood, Engineer :—
B. E. Nightingale (accepted)..... £988 0 0

LONDON.—For alterations and shop-fittings :—
79, Bishops-road.
G. M. Greenwell, 5, Finsbury-square £325
107, London-road.
G. M. Greenwell 142 10 0
2, Great Queen-street.
G. M. Greenwell 120 0 0

MORDEN (Surrey).—For chapel buildings for new cemetery at Hobald's Farm, for the Burial Board for the Parish of St. Mary, Battersea. Mr. William C. Poole, architect, 62, Belleville-road, Wandsworth-common, S.W. :—

W. Neave & Son	£7,175	Jas. H. Jarvis	£4,983
Wm. Hammond	5,455	Hugh Knight	4,863
John Garrett & Son	5,400	J. O. Richardson	4,669
Jos. Dorey	5,000	Walter Wallis (accepted)	4,667
Thos. Gregory & Co.	4,987	[Architect's estimate, £5,061.]	

NANTWICH.—For the erection of agent's house at Crewe-green, Crewe, for the Right Honourable Lord Crewe. Mr. Thomas Bower, architect, Nantwich. Quantities by Mr. Henry Lovegrove, London :—
John Stringer, Sandbach (accepted) £3,058 0 0

PLUMSTEAD.—For bar fittings at the "Dover Castle," for Mr. Lomax. Mr. H. H. Church, architect :—
Sanders & Sons, 228, High Holborn (accepted) £231 10 0

ST. IVES (Cornwall).—For the erection of a police-station and appurtenances, for the Cornwall County Council. Mr. Oliver Caldwell, architect, Victoria-square, Penzance :—

James Julian	£1,260 0 0	Arthur Carkeek, Redruth (accepted)	£690 0 0
Robert Toy	816 12 9		

[Architect's estimate, £835.]

SOUTHEND (Essex).—For the erection of boarding establishment at Southend-on-Sea, for Mr. F. Caister. Mr. Edward Wright, architect. Quantities by Mr. Henry Lovegrove :—

Nightingale	£4,888	Baker & Wiseman	£4,175
Ansell	4,884	Everett	4,119
Smith & Sons	4,537	Woodhams	4,072
Orfeur	4,245	Dupont	4,000
Dobson	4,180	Dark & Son, Southend	3,950

[Architect's estimate, £3,998.]

SUTTON (Surrey).—For building north aisle and vestries to St. Barnabas Church. Messrs. Carpenter & Ingelow, architects, 4, Carlton-chambers, S.W. Quantities supplied by Mr. Geo. Jackson, 31, Charing-cross, S.W. :—

Page	£2,448	Smith & Sons	£2,215
Colls & Sons	2,340	Goddard & Sons	2,155
Bentley	2,329	Humphries*	1,995
Wyatt	2,224	* Accepted.	

SWANLEY (Kent).—For the erection of home for the trustees of the Hospital Convalescent Home. Mr. E. B. I'Anson, M.A., architect :—

J. Shillitoe & Son*	£29,150	Paramore	£28,000

* Accepted; also accepted for floors being in wainscot oak, £2,000.

[For full list of tenders see p. 58 *ante*.]

YORK.—For the supply of ironwork in the erection of new cocoa works, for Messrs. H. J. Rowntree & Co. Messrs. Malcolm, Stark, & Rowntree, architects, 167, St. Vincent-street, Glasgow :—
Cast-iron Gutters, Columns, &c.
W. Thomlinson Walker, York (accepted)..... £796 0 9
Steel Girders, &c.
C. C. Dunkerley & Co., Manchester (accepted)..... 423 11 0

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Oak Wood Tapestry Dadoes, from 1s. per foot super.
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TO CORRESPONDENTS.

"Fair Play" (we see nothing calling for special comment, nor do we understand your motive for wishing it).—G. H. M. (pipe bursts at the time of freezing; the result only becomes manifest at the thaw. Hence many people imagine it is the thaw that does the mischief.—L. & Co.—A. B. B. (we quite share your feelings, though we do not see anything to be gained by printing your letter).—T. M. R. (your copy came to hand after the paper was published, but we had previously obtained a paragraph from another source).—H. S. (should have sent amount).—M. & Son (ditto).—V. D. (ditto).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

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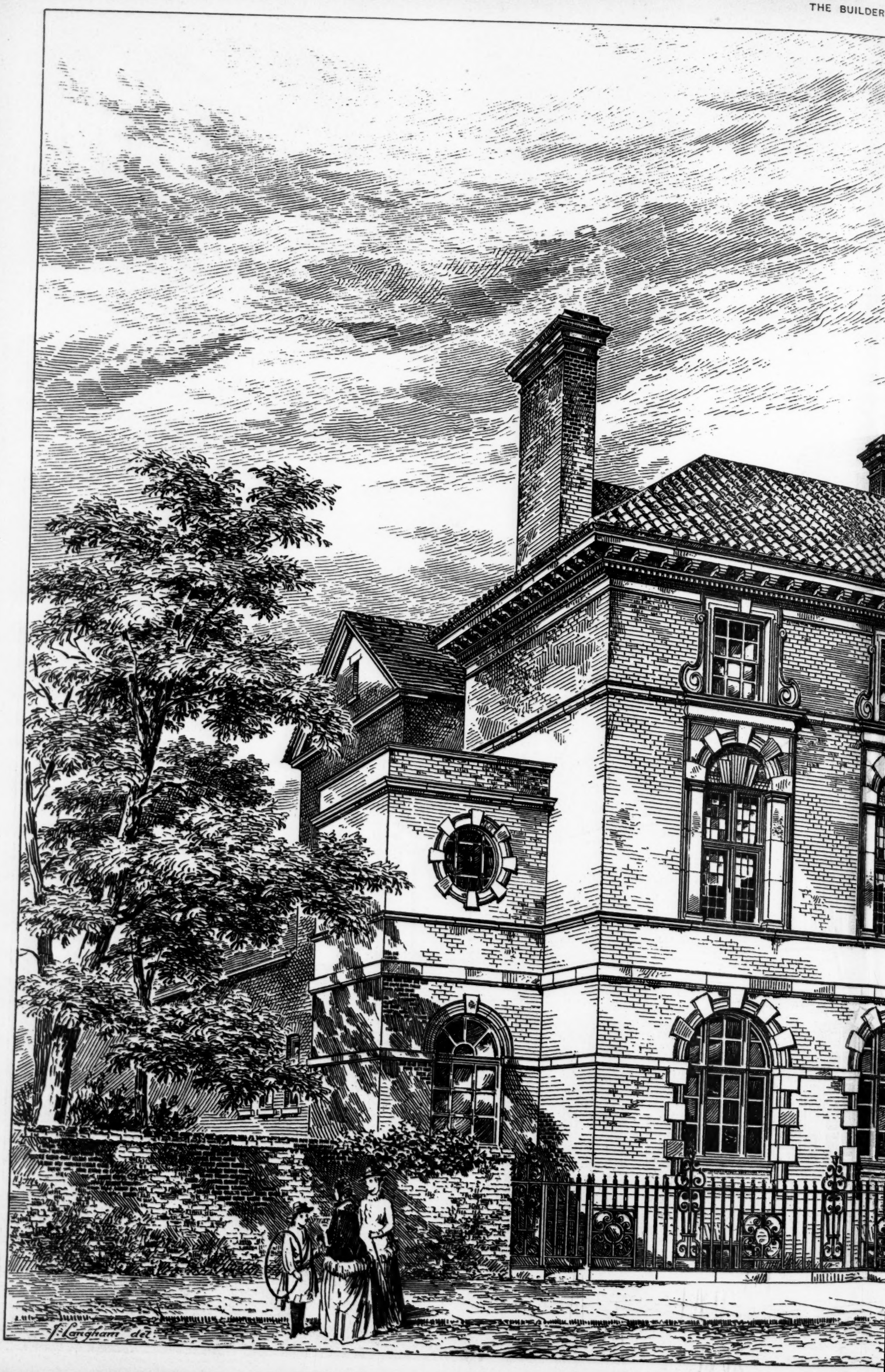
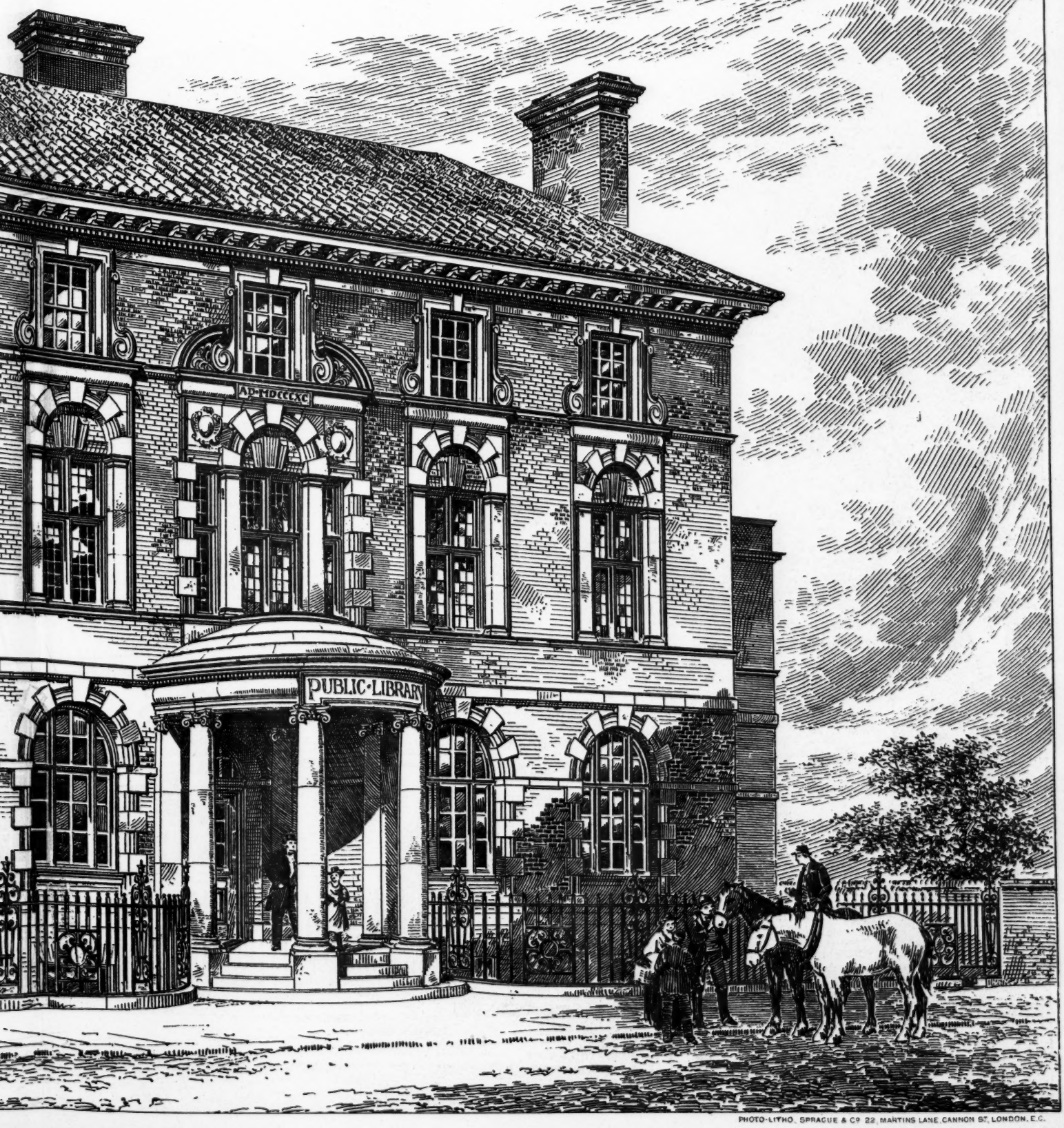

J. Langham del.

CENTRAL LIBRARY CHELSEA

J. M. Brydon Architect



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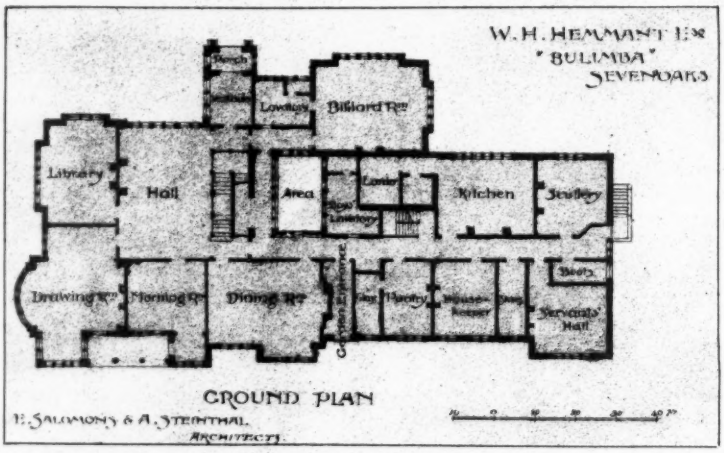
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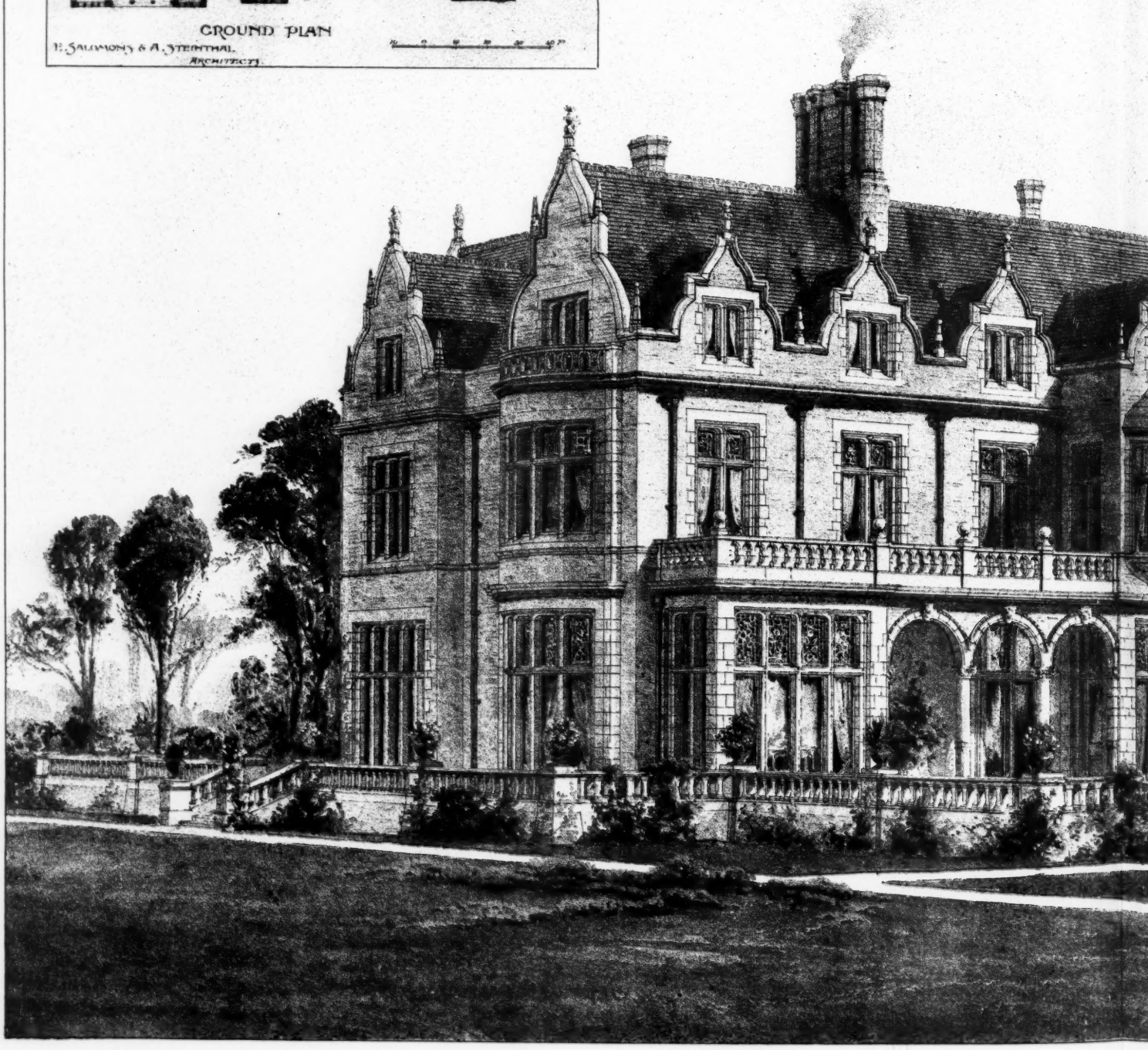

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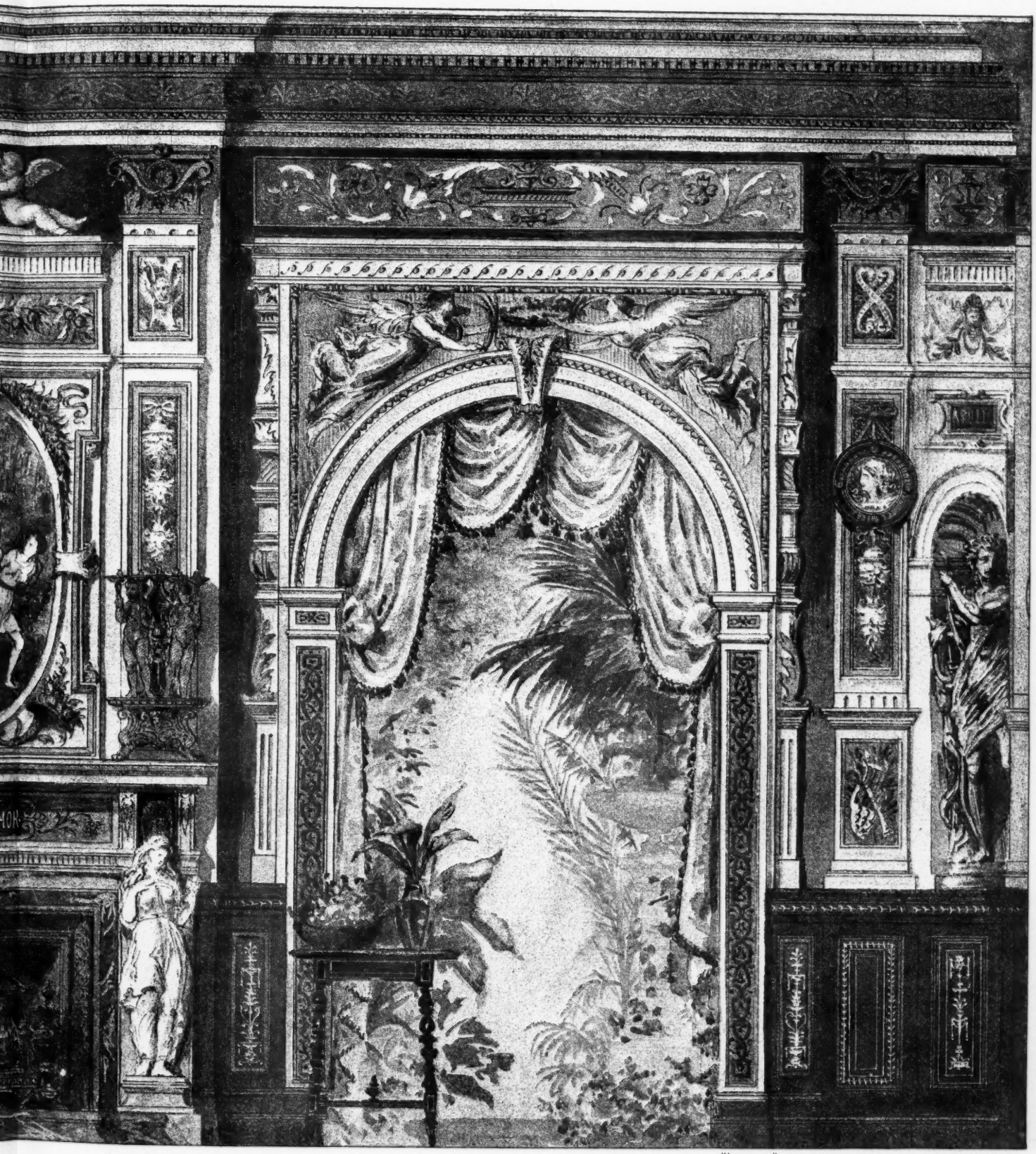
DESIGN FOR DRAWING ROOM DECORA



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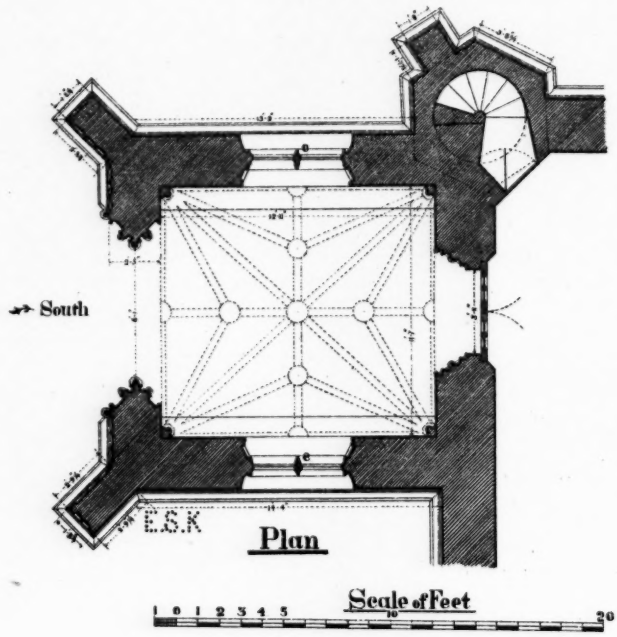

Plan

Scale of Feet

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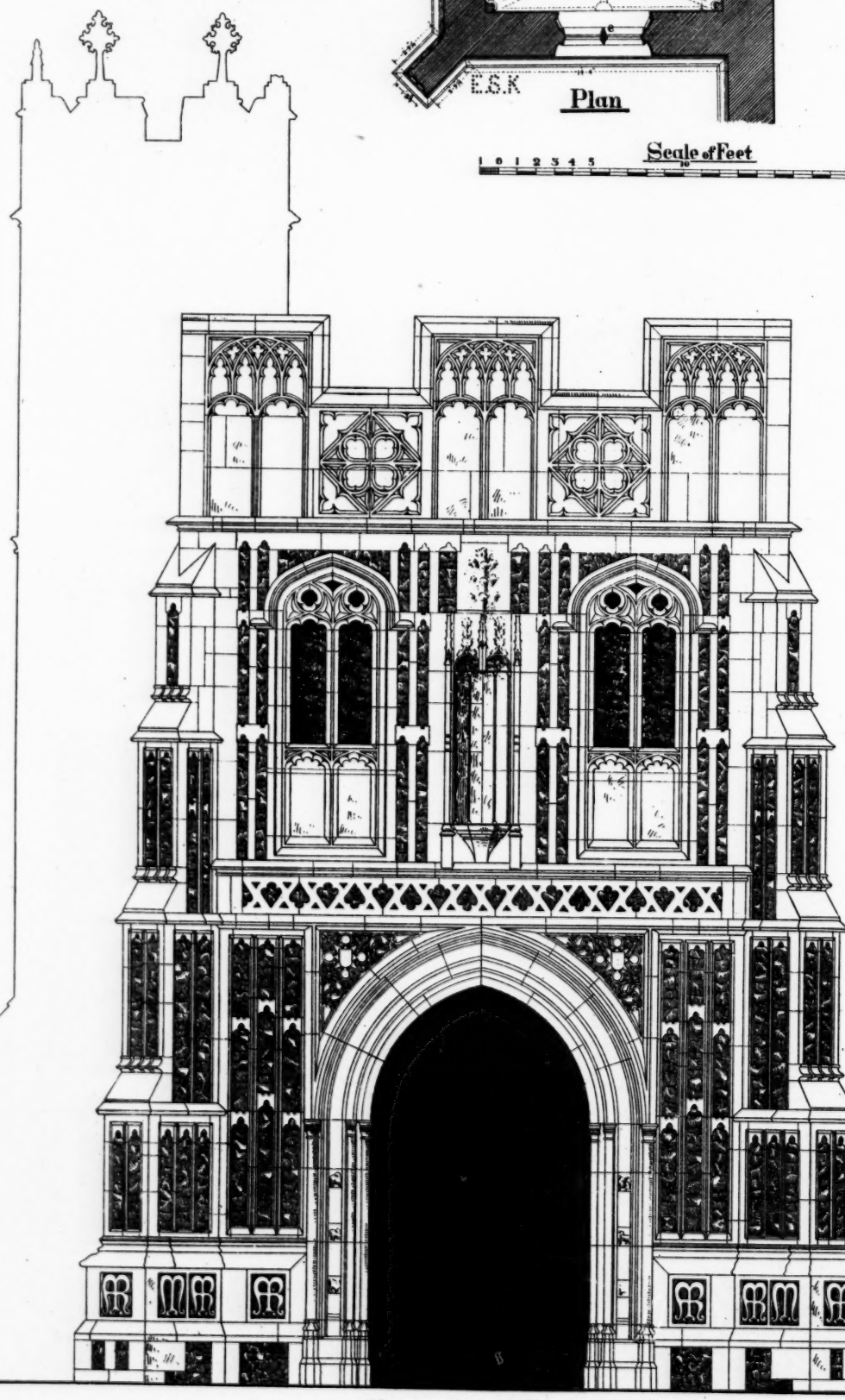

Front Elevation

Scale of Feet

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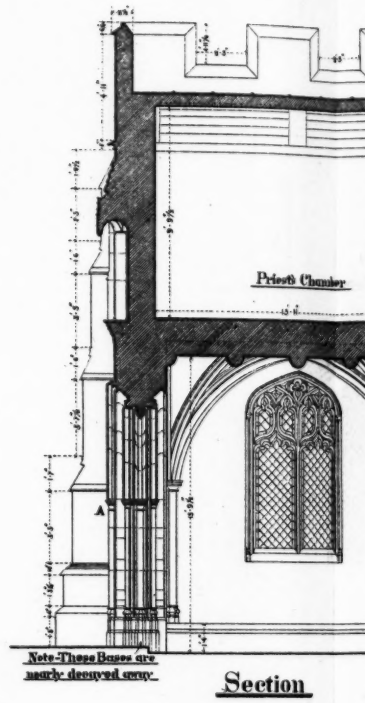
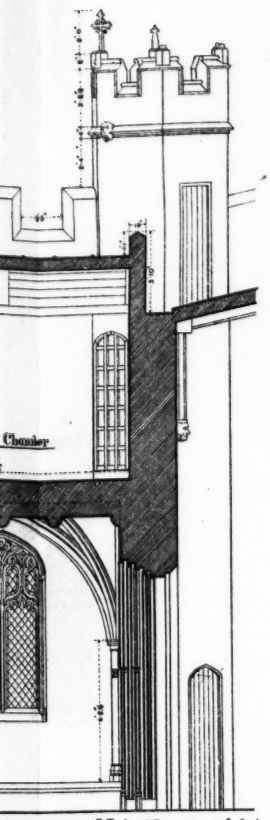


Note-These Bases are nearly destroyed servy.

Section

Porch of St. Edmund
Southwold

Measured and Drawn by Percy K. Allen 1867.

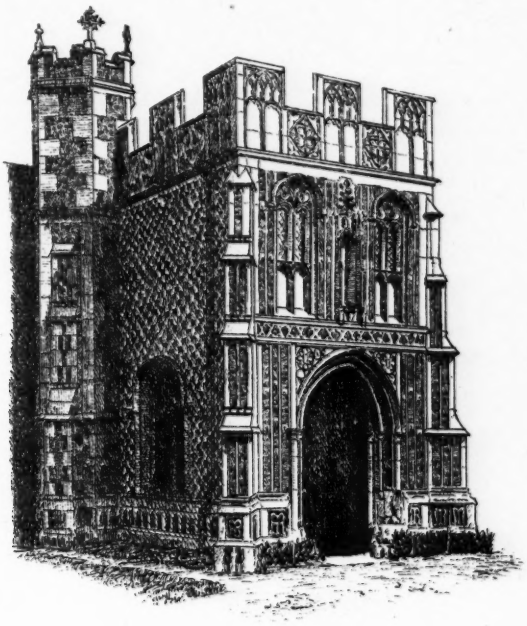


Note-The stone joints were plotted on the spot.

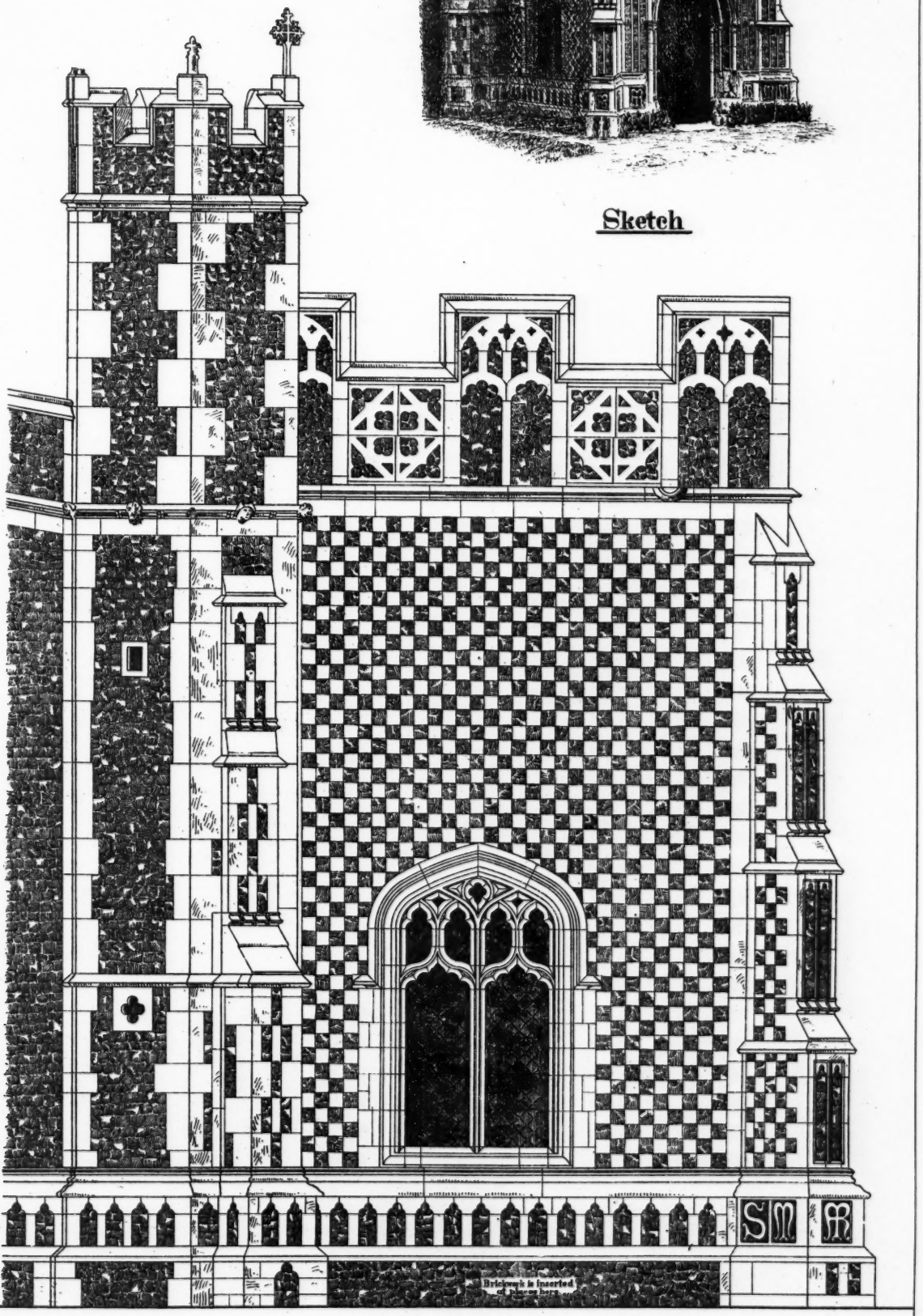
n

nund's Church

wold.



Sketch



Side Elevation

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